1051-A-11

Y3. N88: 25/4551/v. 3

JUN 16 1987

NUREG/CR-4551
SAND86-1309
Volume 3 (2 of 2)
Printed May 1987

DRAFT FOR COMMENT

ORIGINAL COMPLETED
532

Evaluation of Severe Accident Risks and the Potential for Risk Reduction: Peach Bottom, Unit 2

Appendices

C. N. Amos, A. S. Benjamin, G. J. Boyd, J. M. Griesmeyer, F. E. Haskin, J. C. Helton, D. M. Kunsman, S. R. Lewis, L. N. Smith

Prepared by
Sandia National Laboratories
Albuquerque, New Mexico 87185 and Livermore, California 94550
for the United States Department of Energy
under Contract DE-AC04-76DP00789

Prepared for
U. S. NUCLEAR REGULATORY COMMISSION

NOTICE

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, or any of their employees, makes any warranty, expressed or implied, or assumes any legal liability or responsibility for any third party's use, or the results of such use, of any information, apparatus, product or process disclosed in this report, or represents that its use by such third party would not infringe privately owned rights.

NOTICE

Availability of Reference Materials Cited in NRC Publications

Most documents cited in NRC publications will be available from one of the following sources:

1. The NRC Public Document Room, 1717 H Street, N.W.
   Washington, DC 20555
2. The Superintendent of Documents, U.S. Government Printing Office, Post Office Box 37082, Washington, DC 20013-7082
3. The National Technical Information Service, Springfield, VA 22161

Although the listing that follows represents the majority of documents cited in NRC publications, it is not intended to be exhaustive.

Referenced documents available for inspection and copying for a fee from the NRC Public Document Room include NRC correspondence and internal NRC memoranda; NRC Office of Inspection and Enforcement bulletins, circulars, information notices, inspection and investigation notices; Licensee Event Reports; vendor reports and correspondence; Commission papers; and applicant and licensee documents and correspondence.

The following documents in the NUREG series are available for purchase from the GPO Sales Program: formal NRC staff and contractor reports, NRC-sponsored conference proceedings, and NRC booklets and brochures. Also available are Regulatory Guides, NRC regulations in the *Code of Federal Regulations*, and *Nuclear Regulatory Commission Issuances.*

Documents available from the National Technical Information Service include NUREG series reports and technical reports prepared by other federal agencies and reports prepared by the Atomic Energy Commission, forerunner agency to the Nuclear Regulatory Commission.

Documents available from public and special technical libraries include all open literature items, such as books, journal and periodical articles, and transactions. *Federal Register* notices, federal and state legislation, and congressional reports can usually be obtained from these libraries.

Documents such as theses, dissertations, foreign reports and translations, and non-NRC conference proceedings are available for purchase from the organization sponsoring the publication cited.

Single copies of NRC draft reports are available free, to the extent of supply, upon written request to the Division of Information Support Services, Distribution Section, U.S. Nuclear Regulatory Commission, Washington, DC 20555.

Copies of industry codes and standards used in a substantive manner in the NRC regulatory process are maintained at the NRC Library, 7920 Norfolk Avenue, Bethesda, Maryland, and are available there for reference use by the public. Codes and standards are usually copyrighted and may be purchased from the originating organization or, if they are American National Standards, from the American National Standards Institute, 1430 Broadway, New York, NY 10018.

NUREG/CR-4551, VOL. 3: DRAFT REPORT FOR COMMENT (FEBRUARY, 1987)

Appendix A

CONTAINMENT LOADING AND PERFORMANCE UNCERTAINTY ISSUES

V

A

CONTENTS

Section Page

A.1 SELECTION OF THE CONTAINMENT UNCERTAINTY ISSUES A-1
A.2 PROBABILITY OF A STUCK-OPEN TAILPIPE VACUUM BREAKER A-4
A.3 USE OF THE HIGH PRESSURE SERVICE WATER SYSTEM SPRAY AS A RECOVERY A-5
A.4 PROBABILITY THAT THE OPERATIONS STAFF IS UNABLE TO VENT DURING STATION BLACKOUT A-5
A.5 PROBABILITY THAT THE OPERATIONS STAFF IS UNABLE TO VENT AFTER AC POWER RECOVERY A-6
A.6 LEVEL OF SUPPRESSION POOL BYPASS THROUGH A STUCK OPEN SAFETY/RELIEF VALVE VACUUM BREAKER A-7
A.7 CONTAINMENT FAILURE PRESSURE AND LOCATION A-8
A.8 CONTAINMENT FAILURE SIZE A-14
A.9 FAILURE MODE OF THE REACTOR PRESSURE VESSEL A-16
A.10 CONTAINMENT PRESSURE PRIOR TO VESSEL BREACH FOR STATION BLACKOUT SCENARIOS A-20
A.11 CONTAINMENT PRESSURE RISE AT VESSEL BREACH A-22
A.12 PROBABILITY OF DRYWELL SHELL MELTTHROUGH A-30
A.13 PROBABILITY OF HYDROGEN BURNS IN REACTOR BUILDING SUFFICIENT TO CAUSE BYPASS A-32
References for Appendix A A-36

VI

LIST OF TABLES

Table — Page

A-1 Ranking of Uncertainty Issues for Containment Loading and Response for Peach Bottom A-3
A-2 Size of Suppression Pool Bypass for a Stuck Open SRV Tailpipe Vacuum Breaker A-8
A-3 Reviewer Input for Containment Pressure and Location, Case 1: Prior to or at Vessel Breach, Drywell Temperature Less than 500°F A-11
A-4 Reviewer Input for Containment Pressure and Location, Case 2: After Vessel Breach, Drywell Temperature Greater than 1200°F A-12
A-5 Standard Deviations for Containment Failure Pressure Levels A-13
A-6 Reviewer Input for Size of Containment Failure A-15
A-7 Vessel Failure Mode for High-Pressure Sequences A-19
A-8 Reviewer Input for Containment Pressure Prior to Vessel Breach for Long-Term Station Blackout A-22
A-9 Boundary Conditions for Pressure Rise at Vessel Breach A-22
A-10 Weighting Factors for Pressure Rise at Vessel Breach A-26
A-11 Containment Pressure Rise Due to Interaction of the Core with the Drywell Sump Water A-30
A-12 Probability of Drywell Meltthrough A-32
A-13 Reviewer Input for the Probability of Hydrogen Burns in Reactor Building Sufficient to Cause Bypass A-35

NUREG/CR-4551
SAND86-1309
Volume 3 (2 of 2)
Appendices

EVALUATION OF SEVERE ACCIDENT RISKS AND THE POTENTIAL FOR RISK REDUCTION: PEACH BOTTOM, UNIT 2

C. N. Amos*
A. S. Benjamin
G. J. Boyd**
J. M. Griesmeyer
F. E. Haskin
J. C. Helton***
D. M. Kunsman
S. R. Lewis**
L. N. Smith****

Printed May 1987

Sandia National Laboratories
Albuquerque, NM 87185
Operated by
Sandia Corporation
for the
U. S. Department of Energy

Prepared for
Division of Reactor System Safety
Office of Nuclear Regulatory Research
U. S. Nuclear Regulatory Commission
Washington, DC 20555
Under Memorandum of Understanding DOE 40-550-75
NRC FIN No. A1322

*Technadyne Engineering Consultants, Inc., Albuquerque, NM
**Safety and Reliability Optimization Services, Inc., Knoxville, TN
***Arizona State University, Tempe, AZ
****Science Applications International Corporation, Albuquerque, NM

VIII

BEST COPY AVAILABLE

PREFACE

Because of the time constraints imposed on this work to meet the Nuclear Regulatory Commission's schedule for publication of NUREG-1150, this draft report has not yet received the full level of peer and management review customarily accorded to reports issued by Sandia National Laboratories. The reviews will be completed and corrections made, if necessary, prior to final publication.

This report contains only the appendices of the report. The main report is published separately.

BLANK PAGE

REQUEST FOR COMMENT

This report, NUREG/CR-4551, "Evaluation of Severe Accident Risks and Potential for Risk Reduction," was prepared for the U.S. Nuclear Regulatory Commission by the Sandia National Laboratories and its subcontractors.

The methods and results set forth in this report are being used by the NRC to support the development of the Reactor Risk Reference Document (NUREG-1150) and will be used in areas of broad public interest such as probabilistic risk analyses, emergency response planning, siting, NRC safety goal applications, and cost/risk/benefit analyses--indeed, wherever risks to public health need to be considered in regulatory applications. Thus, it is considered imperative that an opportunity for public comment on the results as presented in the report be provided. Comments should be sent to the U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, Attention: Joseph Murphy, Division of Reactor System Safety. These comments will be most useful to the staff if they are received by August 1, 1987.

Of particular interest to us is the receipt of comments on the methodology, and results, related to uncertainty analysis. One criticism voiced with respect to the Reactor Safety Study was its lack of an uncertainty analysis. We have included an uncertainty analysis, but we are sure that its nature will be the subject of lively debate. We welcome this, and solicit constructive advice and criticism.

The NRC hereby expresses its great appreciation to all participants in this study for their considerable efforts, as well as to all who will take the time and effort to provide it with comments on this report.

D F Ross

D. F. Ross, Deputy Director
Office of Nuclear Regulatory Research

ACKNOWLEDGMENTS

A number of individuals have contributed to this program. In particular, the authors would like to thank the members of the review groups listed in Section 2 who provided valuable comments on the work as it progressed and who participated directly in the collection of input for the uncertainty analysis. The following Sandia personnel also provided analysis and input for use in this report: R. L. Iman, M. J. Shortencarier, and D. C. Williams.

ABSTRACT

The Severe Accident Risk Reduction Program (SARRP) has completed a rebaselining of the risks to the public from a boiling water reactor with a Mark I containment (Peach Bottom, Unit 2). Emphasis was placed on determining the magnitude and character of the uncertainties, rather than focusing on a point estimate. The risk-reduction potential of a set of proposed safety option backfits was also studied, and their costs and benefits were also evaluated. It was found that the risks from internal events are generally low relative to previous studies; for example, most of the uncertainty range is lower than the point estimate of risk for the Peach Bottom plant in the *Reactor Safety Study* (RSS). However, certain unresolved issues cause the top of the uncertainty band to appear at a level that is comparable with the RSS point estimate. These issues include the modeling of the common-mode failures for the dc power system, the likelihood of offsite power recovery versus time during a station blackout, the probability of drywell failure resulting from meltthrough of the drywell shell, the magnitude of the fission product releases during core-concrete interactions, and the decontamination effectiveness of the reactor enclosure building. Most of the postulated safety options do not appear to be cost effective, although some based on changes to procedures or inexpensive hardware additions may be marginally cost effective. This draft for comment of the SARRP report for Peach Bottom is published in two parts, this part containing the detailed technical Appendices. This work supports the Nuclear Regulatory Commission's assessment of severe accidents in NUREG-1150.

Appendix A

CONTAINMENT LOADING AND PERFORMANCE UNCERTAINTY ISSUES

The input to the Limited Latin Hypercube (LLH) sensitivity analysis of the containment response to severe accidents for the Peach Bottom plant is described in this section. Issues considered to be both uncertain and important to the risk results were identified and presented to a group of experts in order to obtain a cross-section of expert opinion on the possible phenomena and the range of outcomes that might be associated with these issues. The experts selected to provide input for this portion of the LLH study are listed below. Two principal groups were formed, one to deal with issues primarily involving containment loading, and the other to help identify the response of the containment to these loadings. Due to the nature of some of the issues, a different subset of the total review group provided input depending on the specific expertise of the individuals and the nature of the issue. The participants in the LLH review task for the Peach Bottom containment analysis are listed below:*

	Containment Loading	
• C. Amos	Technadyne	Principal SARRP analyst
• M. Corradini	University of Wisconsin	
• R. Denning	Battelle Columbus Laboratories	
• G. Greene	Brookhaven National Laboratory	
• F. Haskin	Sandia National Laboratories	
• S. Hodge	Oak Ridge National Laboratories	
• M. Khatib	U. S. Nuclear Regulatory Commission	
• K. Perkins	Brookhaven National Laboratory	
• D. Powers	Sandia National Laboratories	

	Containment Response	
• C. Amos	Technadyne	Principal SARRP analyst
• H. Ashar	U. S. Nuclear Regulatory Commission	
• R. Denning	Battelle Columbus Laboratories	
• F. Haskin	Sandia National Laboratories	
• C. Hofmayer	Brookhaven National Laboratory	
• W. Von Reisemann	Sandia National Laboratories	
• K. Perkins	Brookhaven National Laboratory	

A.1 SELECTION OF THE CONTAINMENT UNCERTAINTY ISSUES

The intent of the LLH uncertainty study was to explore the sensitivity of the calculated risk of the Peach Bottom plant to both assumptions and modeling of physical processes and phenomena that are currently not completely understood due to a lack of experimental data and/or validated models. This task focused on the most important uncertainties, both in terms of the range of uncertainty associated with the issue as well as the impact of the uncertainties on risk. These uncertainties were treated as "issues" that serve to coalesce many detailed modeling and input data uncertainties into broader categories that generally refer to the ultimate outcome of interest. For example, the estimated pressure rise following reactor vessel breach may be affected by modeling process of heat transfer, uncertainties in boundary conditions as well as many other physical process uncertainties, all of which are treated together in terms of their final outcome--the total pressure rise.

---

*The reviewers are identified by number only in the discussion that follows. The order of participants below is not the same as the order of reviewers identified in the tables.

The SARRP analysts developed a list of candidate issues based on the insights from the containment analysis [1]. The analysis completed prior to the review meeting included partial results for all areas of the risk study, and these preliminary results were used to identify the key contributors and to assess potential risk impacts. The SARRP analyst provided to the review team: 1) a list of issues and background concerning the state of the art on the issues, 2) a proposed set of discrete issue outcomes (levels), and 3) a SARRP estimate of weighting factors. (The report issued prior to the LLH meeting is referred to as the "strawman".) All of the same data is provided in this report also, along with the additional information supplied by the groups of experts. The experts first verified that the level definitions for the issue were appropriate (spanned the range of uncertainty); if not, new levels were defined. Then the reviewers provided their individual weighting factors for each level, representing their views of the relative likelihoods of the different levels within the specified uncertainty range for each issue.

The list of issues is illustrated in Table A-1, as are the individual priority rankings of the reviewers. The priorities were assigned on a three point scale, with a "1" being most important; i.e., the uncertainty in the issue would likely have a significant impact on the risk measures for Peach Bottom. These rankings were requested so as to provide guidance for the SARRP analysts in dealing with the most important issues first if treatment of the full list of uncertainties was not practical within the time available. The reasons behind the rankings of the issues are discussed in the sections that follow, along with a detailed description of the issues and the uncertainty associated with the issue.

The final step in the LLH process was the translation of the reviewer input into a format which was consistent with the computer tools (software). The LLH input required some sort of composite view of the expert reviewers' inputs. Whenever a single set of weighting factors was assigned, the composite was calculated as the arithmetic mean of the individual experts'

Table A-1

RANKING OF UNCERTAINTY ISSUES FOR CONTAINMENT LOADING AND RESPONSE FOR PEACH BOTTOM

Issue	Priority Reviewer								Composite
	1	2	3	4	5	6	7	8	
1. Probability of Stuck-Open Drywell Vacuum Breaker[1]	–	–	–	–	–	–	–	–	–
2. Use of the High Pressure Service Water System as a Recovery[1]	–	–	–	–	–	–	–	–	–
3. Probability that the Operations Staff Fails To Vent Containment During a Blackout[1]	–	–	–	–	–	–	–	–	–
4. Probability that the Operations Staff Fails To Vent Containment Following Ac Recovery[1]	–	–	–	–	–	–	–	–	–
5. Size of Bypass Due to Stuck-Open Tailpipe Vacuum Breaker	2	3	2	2	3	–	–	–	2.4
6. Containment Failure Pressure and Location	1	1	1	1	1	–	–	–	1.0
7. Containment Failure Size	1	1	1	1	1	–	–	–	1.0
8. Failure Mode of the Reactor Pressure Vessel	1	1	1	1	1	2	1	1	1.1
9. Containment Pressure Prior to Vessel Breach for Station Blackout	1	1	1	1	1	3	1	1	1.3
10. Pressure Rise at Vessel Breach	2	1	1	2	1	2	1	1	1.4
11. Probability of Drywell Meltthrough	1	1	1	1	1	1	2	1	1.1
12. Probability of Hydrogen Burns Sufficient to Cause Reactor Building Bypass	2	1	2	2	2	2	3	1	1.9

[1] The discussion of these issues did not involve a priority ranking.

inputs (the SARRP values were not included in the composite). For binary issues where the reviewers supplied their estimates of the probability of occurrence (or non-occurrence) of a given event, the two outcomes were weighted according to the mean of the experts' subjective probability assignments. This allowed both of these binary outcomes to be sampled in order to determine the impact of the uncertainty involved (i.e., the presence or absence of the event in question). Sometimes there was little distinction between some levels, or some levels were assigned weighting factors too small to contribute significantly in the small sample size being used (approximately 150 sample members). In these cases the SARRP analyst adjusted the input, retaining the original intent of the LLH reviewers.

The expert input on each issue is supplied below. The discussion also includes a description of how the input was actually implemented in SARRP, and any limitations resulting from the method of implementation.

A.2 PROBABILITY OF A STUCK-OPEN TAILPIPE VACUUM BREAKER

Examination of operating history for BWRs has indicated a potentially significant problem relative to partial suppression pool bypass for steam released through the safety/relief valves (SRVs). Each SRV tailpipe is equipped with vacuum breakers to prevent suppression pool water from being drawn back into the pipe as the steam remaining in the tailpipe condenses following an SRV demand. Some plants have experienced significant reliability problems with these vacuum breakers to the point where the valves would fail to reclose following nearly every demand. This problem appears to result from the large force applied to the valve as it opens after an SRV demand. Physical damage to the valve flapper and the hinge pin have been seen. This problem has been addressed through redesign, both at Browns Ferry and Peach Bottom, but there has not been enough operating experience to show that the design change has been fully effective, particularly under the conditions of repeated demands as might be the case with many of the core-melt accident sequences. The result of this failure would be a partial bypass of the pool. This bypass arises because steam (and fission products if core damage has occurred) passes into the drywell through the stuck open vacuum breaker rather than flowing down the tailpipe into the suppression pool. Although the drywell is vented to the suppression pool, the steam discharge would result in drywell heatup and consequent additional pressurization of the containment. If fission products are present in the steam flow, some portion will remain suspended in the drywell atmosphere rather than being deposited in the suppression pool.. Thus there are two impacts of a stuck open SRV tailpipe vacuum breaker that are considered: 1) added containment pressurization and 2) increased source-term magnitude.

The event is treated in the containment event tree because it alters the progression of the the accident and has a potentially large impact on the source term since it can lead to pool bypass and hence reduced scrubbing effectiveness. This event is has no impact on the probability of core damage. However, the uncertainty in this issue was treated in a fashion similar to the front-end issues because the data values are derived from ASEP sources [2]. Therefore the expert review groups did not provide weighting factors, rather a probability distribution function for the failure of this component was provided by the ASEP analysts. This distribution was discretized into levels representing the 5th, 30th, 70th and 95th percentiles of the distribution. The discrete values used to represent this uncertainty in the LLH analysis are listed below:

Probability of a Stuck-Open Tailpipe Vacuum Breaker	.29	.62	.94	1.0
Weighting Factor	.1	.4	.4	.1

The weighting factors are taken directly from the ASEP failure distribution. The relatively high values for this event come from operating experience which has indicated a real reliability problem with these valves at some facilities. As described above, most plants (including Peach Bottom) have since performed modifications to reduce the probability of a stuck-open vacuum breaker, but the operating experience is insufficient to allow firm conclusions regarding the effectiveness of the modifications. It should be noted that the probability values used account for all of the vacuum breakers that are challenged, as well as the increased probability associated with multiple demands.

A.3 USE OF THE HIGH PRESSURE SERVICE WATER SYSTEM SPRAY AS A RECOVERY

One of the potential recovery actions considered in the containment event tree model was the use of the high pressure service water (HPSW) system as a means of providing drywell spray. Since this is a recovery option that involves operator action outside the written procedures, the assessment of a probability of success or failure for this action is subject to large uncertainty. A probability distribution for failure of the operations staff to use the HPSW as a drywell spray option was provided by ASEP. The derivation of this distribution was consistent with the quantification of other human reliability events in the ASEP model. However, no specific human reliability analysis of this issue was performed. As with the previous issue, the distribution was discretized into levels representing the 5th, 30th, 70th and 95th percentiles. The discrete values used to represent this uncertainty in the LLH analysis are listed below:

Probability of Using HPSW for Spray	0.13	0.3	0.66	0.94
Weighting Factor	.1	.4	.4	.1

A.4 PROBABILITY THAT THE OPERATIONS STAFF IS UNABLE TO VENT DURING STATION BLACKOUT

In the absence of some postulated drywell failure modes (drywell meltthrough, for example), venting of the containment may serve to reduce the quantity of fission products released from containment. Depending upon the effectiveness of suppression pool scrubbing this reduction in release may be large. Thus the uncertainty in the probability of venting has a potentially large impact on the uncertainty in predicted risk.

According to the Peach Bottom emergency operating procedures, the wetwell is to be vented should the containment pressure exceed 60 psig. There are essentially two means of successfully venting the wetwell. An integrated leak rate system test line (6 inch diameter) with two motor-operated and two air-operated valves in series could be used. This line is terminated outside the reactor building by a blind flange held in place by eight bolts. The other option involves the use of the wetwell purge lines (18 inch diameter). Each of these lines has two air-operates valves (normally closed) in series that also close automatically on a containment isolation signal (which would occur in any sequence considered).

As noted above, procedures have been established for venting the Peach Bottom containment during a station blackout. Review of these procedures by the ASEP and SARRP analysts resulted in the conclusion that their successful implementation was unlikely. In the absence of ac power, none of the lines can be opened from the control room. This assessment that success is unlikely is therefore based on the requirement that plant personnel risk exposure to high radiation and high temperature in the reactor building by manually opening valves. The air operated valves would have to be opened with compressed gas from portable cylinders, connected through copper tubing. The motor-operated valves would have to be opened manually. No lighting would be available (due to the loss of power) in many of the areas that would have to be entered. In addition, there would be fewer plant indications (most notably the containment pressure) to help the operator to assess the situation and the need for venting. There is uncertainty in this conclusion that venting is unlikely, because anticipation of the need to vent could allow actions to be taken before physical limitations were too great and venting could become feasible.

The assessment of the ASEP analysts was that the mean failure probability for venting during a station blackout is 0.9 [2]. A maximum entropy distribution (lower bound 0.5 and upper band 1.0) was assumed. This distribution was discretized as follows:

Station blackout with no ac power	0.7	0.88	0.96	0.99
Weighting Factors	0.1	0.4	0.4	0.1

Due to the high mean value of failure, the assessed uncertainty in this issue is actually very small, limiting the impact of this issue in the LLH sample.

A.5 PROBABILITY THAT THE OPERATIONS STAFF IS UNABLE TO VENT AFTER AC POWER RECOVERY

This issue involves the same concerns as the previous issue, but the boundary conditions are different. It is potentially important for the same reasons as discussed above. Given that ac power is available and that the containment pressure exceeds the threshold for venting, the procedure calls for venting of containment using ac-powered valves. This procedure is executed from the control room. The assessment of the ASEP analysts was that the mean failure probability for venting under these conditions is 0.01[2]. A log-uniform distribution was assumed (with an error factor of ten). The distribution was discretized as follows:

Station blackout with ac recovery	0.0015	0.0042	.012	.028
Weighting Factors	0.1	0.4	0.4	0.1

A.6 LEVEL OF SUPPRESSION POOL BYPASS THROUGH A STUCK OPEN SAFETY/RELIEF VALVE TAILPIPE VACUUM BREAKER

This issue is a different facet of the uncertainty associated with the first containment issue, the probability of a stuck open vacuum breaker. Because information on the exact failure mode is lacking, the size of the flow pathway to the drywell resulting from this event was also selected as a containment uncertainty issue for the LLH study of Peach Bottom. Four levels of bypass were suggested to represent the range of leakage for one stuck open vacuum breaker. The severity of the bypass was expressed in equivalent bypass area, from very small leakage up to a completely stuck open valve. The review team did not feel that the data could support an assessment of four levels of bypass leakage and selected two levels instead--small and large. Small leakage implies that the failure mode of the vacuum breaker involves a failure to fully reseat, perhaps due to physical distortion of the valve flapper. The equivalent flow area for the small bypass would be on the order of a one-to two-inch opening (0.005 to .022 square feet). The second outcome would correspond to the valve being completely stuck open, the equivalent flow area would therefore be somewhere between seven and ten inches after accounting for losses associated with the flow pathway (0.27 to 0.55 square feet).

The fraction of the total flow discharged through an SRV which passes through the stuck-open tailpipe vacuum breaker is dependent on both the equivalent area of the flow path and the pressure in the RPV. If the RPV is at high pressure, flow through both the T-quencher in the suppression pool and the vacuum breaker is choked. The split fraction for flow to the drywell is estimated on the basis of the ratio of the flow areas (area of holes in the quencher/ area of flow in the vacuum breaker). The equivalent flow area for the T-quencher is estimated at slightly less than 0.7 sq ft. If the RPV is at low pressure, the flow split between the two pathways adjusts such that the pressure drops along each pathway are equivalent. Because the T-quencher head is submerged 12 feet in the suppression pool, a 5 psi static head is associated with this pathway. The flows associated with the levels of this issue are listed below:

RPV Pressure	Size of Vacuum Breaker Opening	Fraction of Flow to Drywell
High	Small	0.0
High	Large	0.85
Low	Small	0.15
Low	Large	1.0

The probabilities assigned to the outcomes for this issue are indicated in Table A-2. It should be noted that the group of reviewers was different for this case: it included some individuals not identified as members of the Peach Bottom containment review teams. Some reviewers disqualified themselves due to lack of expertise, while others in the room with appropriate experience were called upon. The reviewers were fairly consistent and assigned a probability of approximately 0.8 to the small leakage case, citing the limited evidence which suggested damage to the valve rather than a completely stuck open valve. Several reviewers also noted that repeated demands of the SRV would also create forces on the valve that could help to force it to reclose, thus lowering the probability of a completely stuck open vacuum breaker. The composite was used directly in the LLH: 84% of the sample members had a small leakage if this failure mode occurred, while the other 16% had large leakage assigned to this case.

Table A-2

SIZE OF SUPPRESSION POOL BYPASS FOR A STUCK OPEN SRV TAILPIPE VACUUM BREAKER

Level of Bypass	Probability								
		Reviewer							
	SARRP	1	2	3	4	5	6	7	Composite
1. Small (.005-.022 ft^2)	.9	.9	.8	.9	.8	.7	.8	.9	.84
2. Large (.27-.55 ft^2)	.1	.1	.2	.1	.2	.3	.2	.1	.16

A.7 CONTAINMENT FAILURE PRESSURE AND LOCATION

The containment failure pressure is an uncertain parameter that can significantly affect risk for sequences involving overpressurization. There is also uncertainty in the location and size of the failure. The predicted location of failure may be correlated to the failure pressure and it is included in this issue. The size of the failure may also be correlated to both the location and the ultimate failure pressure; and this uncertainty is treated as a separate uncertainty issue as described in the next section.

Most recent studies of the Peach Bottom plant have referenced the Ames Laboratory study of containment failure pressure for the Browns Ferry plant [3]. There is one difference in the containments: Browns Ferry has a thicker torus shell (wetwell) which could affect the the applicability to Peach Bottom of the conclusion for Browns Ferry that the wetwell would be much stronger. There has been some recent concern that the mean failure pressure cited in the Ames study (117 psig) is too conservative since the criterion for failure was assumed to be 2% strain. A more realistic strain-based failure criterion of 7 to 15 % has been suggested as more reasonable. In addition, IDCOR has suggested that the shield wall around the containment shell increases the effective strength and therefore the failure pressure might be higher. The less-detailed WASH-1400 examination of the Peach Bottom containment resulted in a predicted mean failure pressure of 160 psig (the assumed location being the torus). Another study of the failure pressure by Chicago Bridge and Iron is currently in progress.

The uncertainty in this parameter was represented by five levels for the LLH study. These levels and their origins are listed below:

Level	Failure Pressure	Source
1	84 psig	150% of design
2	117 psig	Ames study [3]
3	138 psig	Average of Levels 2 and 4
4	160 psig	*Reactor Safety Study* [4]
5	225 psig	400% of design

The failure location is important because of its impact on the source term. Three locations are distinguished; the drywell head seal, the drywell knuckle (in this analysis the knuckle designates any drywell location below the head seal), and the torus (wetwell). The RSS assumed that the failure would occur in the wetwell [4]. Subsequent studies (based on the Ames results, including IDCOR) have assumed a drywell location--either at the knuckle (between the cylindrical and spherical sections) or at some other point in the drywell. A study performed by Chicago Bridge and Iron for IDCOR identified the drywell head seal as a potential location for leakage. The drywell head is of particular significance because release through this path would be directly to the refueling bay which has the least holdup and the potential for a direct path to the atmosphere through the refueling bay blowout panels. The

IDCOR program analysis of Peach Bottom assumes that the failure is in the drywell, although it is caused by elevated temperature rather than pressure. For sequences involving very high temperatures, IDCOR has also predicted a drywell head failure at the seal, although the failure tends to be limited to a leakage path. Some IDCOR representatives have stated that drywell knuckle failure would be unlikely, but it is difficult to separate the issue from other considerations since most of the IDCOR analyses refers to temperature-induced failures.

Because of the dependencies on the boundary conditions, the reviewers were asked to provide their input for two cases as defined below:

Case 1. Prior to or immediately after vessel breach, with containment (structure) temperatures less than 500°F.

Case 2. After vessel failure, with corium on the floor and high drywell temperatures of 800-1200°F.

As described previously, there were indications that the locations were correlated to the estimated failure pressures. To consider this correlation, reviewers were asked to provide weighting factors as illustrated in Table A-3: for each combination of three failure locations and five failure pressure levels. It should be noted that the wetwell failure cases do involve the potential for loss of the pool inventory. For this analysis, a wetwell failure is defined as a type that drains some fraction of the pool inventory [1] 40% of the time. Also, the drywell knuckle case is assumed to include the equipment hatch and personnel airlock since failure there would have similar effects.

The reviewers' inputs are listed in Table A-3 for case 1, which refers to an overpressurization before or at the time of vessel breach with drywell temperatures less than 500°F. There was little discussion of the reasoning behind the selection of the weighting factors since they simply represent engineering judgment of the individuals based on the available information. One reviewer did note that his view of the drywell head failure places it in a category quite different from the other failures. This is addressed directly within the next issue, size of the failure. The results indicate that the level 3 value of failure pressure, 138 psig, was weighted most heavily, which corresponds to an increase over the Ames work to account for conservatisms in that study. The range of values weighted generally corresponded to the Ames study as a lower limit and the WASH-1400 pressure as the upper limit. There was variation in the expected location of failure, although the table illustrates two trends: (1) the drywell location is weighted significantly more heavily than the wetwell and (2) the two types

Table A-3

REVIEWER INPUT FOR CONTAINMENT FAILURE PRESSURE AND LOCATION, CASE 1: PRIOR TO OR AT VESSEL BREACH, DRYWELL TEMPERATURE LESS THAN 500°F

Outcome: Pressure/Location		Probability Reviewer								Composite
		SARRP	1	2	3	4	5	6	7	
	Wetwell	[a]–	–	–	–	–	–	–	–	–
84 psi	Drywell Head	–	.1	–	–	–	–	–	–	.01
	Drywell Knuckle	–	–	–	–	–	–	–	–	–
	Wetwell	–	–	–	–	–	–	–	–	–
117 psi	Drywell Head	.1	.1	.1	.1	–	–	.05	.2	.08
	Drywell Knuckle	.1	.1	.1	.3	.1	.1	.1	.2	.14
	Wetwell	–	–	–	–	.2	.1	.1	–	.06
138 psi	Drywell Head	.15	.3	.25	.1	.2	.1	.1	.2	.18
	Drywell Knuckle	.15	.2	.25	.4	.3	.2	.25	.2	.26
	Wetwell	.4	–	.2	.1	.1	.2	.1	.1	.11
160 psi	Drywell Head	.05	.1	.05	–	.05	.2	.1	.1	.09
	Drywell Knuckle	.05	.1	.05	–	.05	.1	.15	.1	.08
	Wetwell	–	–	–	–	–	–	.05	–	.01
225 psi	Drywell Head	–	–	–	–	–	–	–	–	–
	Drywell Knuckle	–	–	–	–	–	–	–	–	–

[a] For this table, a blank refers to a zero weighting factor.

of drywell failure, head leakage versus the other locations, were weighted approximately equally by most reviewers.

The results for case 2 are delineated in Table A-4. For this case the reviewers shifted their weighting factors to lower values, with the Ames value of 117 psig weighted most heavily. The distribution of locations also changed somewhat in that wetwell failure was considered less likely and the most weight was assigned to the drywell head failure, with several reviewers reporting concern about the seals at the drywell head. This concern echos the issue raised by the Chicago Bridge and Iron study relative to the differential expansion of the head seal bolts due to elevated temperature.

Table A-4

REVIEWER INPUT FOR CONTAINMENT FAILURE PRESSURE AND LOCATION CASE 2: AFTER VESSEL BREACH, DRYWELL TEMPERATURES OF 800 TO 1200°F

Outcome: Pressure/Location		Probability Reviewer								Composite
		SARRP	1	2	3	4	5	6	7	
	Wetwell	[a]–	–	–	–	–	–	–	–	–
84 psi	Drywell Head	.1	.2	.1	–	–	–	.1	.1	.07
	Drywell Knuckle	–	–	–	–	–	–	–	–	–
	Wetwell	–	–	–	–	–	–	–	–	–
117 psi	Drywell Head	.3	.3	.3	.3	.25	.1	.4	.3	.28
	Drywell Knuckle	.15	.2	.15	.3	.25	.2	.1	.15	.19
	Wetwell	–	–	–	.1	–	.1	–	–	.03
138 psi	Drywell Head	.3	.2	.3	.2	.25	.1	.3	.3	.24
	Drywell Knuckle	.15	.1	.15	.1	.25	.25	.1	.15	.16
	Wetwell	–	–	–	–	–	.05	–	–	.01
160 psi	Drywell Head	–	–	–	–	–	.1	–	–	.01
	Drywell Knuckle	–	–	–	–	–	.1	–	–	.01
	Wetwell	–	–	–	–	–	–	–	–	–
225 psi	Drywell Head	–	–	–	–	–	–	–	–	–
	Drywell Knuckle	–	–	–	–	–	–	–	–	–

[a] For this table, a blank refers to a zero weighting factor.

The reviewers were also asked to provide a standard deviation for the distribution of containment failure pressure. There was a great deal of discussion concerning this issue due to the difficulties in defining the meaning of the failure pressure distributions derived for this issue. Each reviewer had a somewhat different interpretation of the input that was being requested as well as of the use of the input in the LLH sensitivity analyses.

One interpretation is that the standard deviation represents the materials properties variabilities in contrast to the modeling uncertainties represented by the weighting factors. Several of the reviewers indicated that the variability in uncertainty parameters is very small compared to the basic uncertainty in the prediction of the failure pressure. There was a strong desire on the part of some of the reviewers to use the input provided to generate a distribution of failure pressure, but that would lead to a disadvantage, because under the sampling scheme used here, there would no investigation of the sensitivity to this issue. The distribution would be used to calculate the probability of failure for given pressurization but the results would not show variation due to changes in the selection of that pressure since only one distribution would be used. Several other alternatives were discussed, none meeting the goal of being able to show the sensitivity in a clear manner. When the discussion was ended it was concluded that the use of a standard deviation provided by each reviewer would have to suffice, although there remained considerable concern about the meaning of the distributions and the ability of the reviewers to provide usable input. The results are listed in Table A-5. Not all of the reviewers provided this input. In general, the standard deviations ranged from 5 to 10 psi, with smaller deviations being applied to the lower failure pressures. One reviewer calculated a constant standard deviation: one-tenth of the difference between the design pressure and the mean failure pressure for the level. This method dealt with the concern of several reviewers that if the standard deviation represented material property variability it must be a constant factor. Because the variability was generally small, the standard deviation in the failure pressure was not sampled in the current analysis.

Table A-5

STANDARD DEVIATIONS FOR CONTAINMENT FAILURE PRESSURE LEVELS

	Outcome: Level/Pressure	Standard Deviation (Psi)							
			Reviewer						
		SARRP	1	2	3	4	5	6	7
CASE 1: PRIOR TO OR AT VESSEL BREACH DRYWELL TEMPERATURES LESS THAN 500°F									
1.	84 psig	[b]--	5	--	--	--	--	--	--
2.	117 psig	--	10	5	--	--	6	3	5
3.	138 psig	--	10	5	--	--	8	3	10
4.	160 psia	--	10	10	--	--	10	4	10
CASE 2: AFTER VESSEL BREACH WITH DRYWELL TEMPERATURES OF 800 TO 1200°F									
1.	84 psig	--	5	5	--	--	--	--	5
2.	117 psig	--	12	10	--	--	6	3	10
3.	138 psig	--	15	10	--	--	8	3	20
4.	160 psia	--	--	--	--	--	10	4	--

[a] No weight was assigned to level 5, and it is therefore not needed in this table.

[b] A blank (--) in this table indicates that the individual reviewer did not provide a weighing factor for that entry.

A.8 CONTAINMENT FAILURE SIZE

Another aspect of containment failure that is of critical concern is the size of the failure. Many previous assessments have assumed that failure implies a rapid depressurization but IDCOR has suggested that a temperature-induced creep failure of the drywell shell that could result in a leak that would depressurize the containment at a much slower rate. This issue is clearly correlated with the previous issue.

The size of the failure has been estimated in several programs. The Containment Performance Working Group recommended upper bound leak sizes for Peach Bottom of 0.25 sq ft for pressure induced failures [5]. The analyses reported in BMI-2104 assume a 7.0 sq ft failure size [6] while IDCOR has generally assumed a 0.1 sq ft failure size [7]. The SARRP analyst initially selected five levels of failure size corresponding to results of previous studies, but the review group changed the approach in the meeting, deciding to use two levels: leak and rupture. The leak corresponds to a hole which does not depressurize the containment within two hours but which does prevent further pressure loading (this would be in the range of .03 sq ft to .25 sq ft). The rupture size refers to an opening which allows full depressurization of the containment in a short time period (greater than .7 sq ft). In order to provide the correlation with previous issues, several cases required reviewer input:

Case 1. Wetwell failure due to pressurization (most likely rapid) with a low torus temperature (< 350 F).

Case 2. Drywell failure (excluding head failure) due to a rapid pressurization with a low torus temperature (< 500 F).

Case 3. Drywell failure (excluding head failure) due to a slow pressurization with a high torus temperature (> 800 F).

Case 4. Drywell head failure.

The reviewers' inputs are illustrated in Table A-6. Case 4 is not shown in the table because it was unanimously decided that the drywell head failures would always be of the leakage type. For cases 1 and 2, the reviewers judged there to be a very high likelihood of a rupture failure, and the same composite probability of rupture failure was used for each. For the high temperature drywell knuckle failure, there was an even split on assignment to leak versus rupture. Several reviewers cited the increased leakage at sites such as the equipment hatch that would start to contribute significantly at high temperature as the basis for their weightings for case 3. The composite values were used to examine this uncertainty. Cases 1 and 2 were combined in the LLH analysis such that the failure size was independent of location (torus or drywell, excluding the head seal). For example, the rapid pressurization cases were assigned a rupture-type failure in 90% of the sample members, a leakage-type failure in the other 10%.

Table A-6

REVIEWER INPUT FOR SIZE OF CONTAINMENT FAILURE

Outcome	Weighting Factors Reviewer								
	SARRP	1	2	3	4	5	6	7	Composite
CASE 1: WETWELL FAILURE DUE TO RAPID PRESSURIZATION, SHELL TEMPERATURE LESS THAN 350°F									
Leak	.3	.1	.1	.1	.01	.1	.1	.01	.07
Rupture	.7	.9	.9	.9	.99	.9	.9	.99	.93
CASE 2: DRYWELL FAILURE AT THE KNUCKLE DUE TO RAPID PRESSURIZATION, TORUS TEMPERATURE LESS THAN 500°F									
Leak	.1	.2	.1	.1	0.0	.2	.1	.1	.11
Rupture	.9	.8	.9	.9	1.0	.8	.9	.9	.89
CASE 3: DRYWELL FAILURE AT THE KNUCKLE DUE TO SLOW PRESSURIZATION, TORUS TEMPERATURE GREATER THAN 500°F									
Leak	.75	.4	.5	.5	.5	.7	.1	.8	.5
Rupture	.25	.6	.5	.5	.5	.3	.9	.2	.5

A.9 FAILURE MODE OF THE REACTOR PRESSURE VESSEL

There have been several failure modes postulated for a BWR RPV. The Peach Bottom containment event tree considers four failure modes:

(1) An in-vessel steam explosion which propels a water slug and core debris upward through the vessel to fail the upper closure head. This mode was postulated to fail containment (alpha mode) in WASH 1400.

(2) An in-vessel steam explosion which directly fails the bottom head of the RPV.

(3) Gross meltthrough of the RPV bottom head following slumping of the molten core debris into the lower plenum. This mode is modeled in the STCP.

(4) Localized meltthrough of a penetration weld in the RPV bottom head as a result of the slow accumulation of partially molten core debris in the lower

plenum. This mode is modeled in the IDCOR Modular Accident Analysis Program (MAAP).

The first two modes were judged by the SARRP analysts and expert reviewers to be sufficiently unlikely as to have a negligible impact on any risk measure for Peach Bottom. BWR vessels have features which would tend to mitigate the effects of a steam explosion. Structures above the core (e.g., steam dryers and separators) would tend to absorb the impact of an upward-directed steam explosion.

However, the last two modes can have very different impacts on the containment loading at vessel breach. The feature which distinguishes these two modes is the quantity of core debris which leaves the vessel in a molten state when pressure integrity is lost. For the slump failure mode, a substantial fraction of the core (100% is assumed in the STCP) is in the lower plenum at vessel failure and the major portion is assumed to be molten. For the localized failure mode, there is less debris in the lower plenum. In addition, most of that debris is assumed to be at or below the solidus temperature, having refrozen on structural components in the lower plenum. If the RPV is at high pressure, the slump failure mode (#3 above) implies that a significant fraction of core debris is ejected under pressure in a molten state into the drywell. The pressurized ejection of molten core debris may give rise to direct heating of the drywell atmosphere. Direct heating was precluded under the localized failure mode (#4 above), since the vessel is assumed to depressurize before a significant quantity of molten debris is ejected in that failure scenario.

A separate containment issue (see Section A.11) address the pressure rise that might be associated with the phenomena that occur as the vessel fails. For example, the impact of any debris which participates in direct heating is included within containment uncertainty issue 10, pressure rise at vessel breach.

If the RPV is at low pressure, the failure mode also affects the quantity of debris available flow across the drywell floor and contact the drywell shell; possibly resulting in melting of the steel wall. This failure mode is discussed below in Section A.12. Some of the experts held that if a slump failure occurred, it was virtually assured that the drywell shell would be melted when debris spread across the floor to the point of embedment (where the edge of the floor contacts the drywell wall). Some also observed that, in the flow melt scenario, the debris is at or below the liquidus temperature when it contacts the drywell floor and thus it will not spread to the wall immediately. In addition, the flow mode presumes that the core debris comes out of the vessel gradually. Thus the core-concrete interaction may erode the cavity at a a rate sufficient to retain the debris as it falls from the vessel; precluding contact between the debris and the drywell shell. Other experts felt that the likelihood of this containment failure mode would be more or less independent of the mode of vessel breach. It is acknowledged that the RPV failure mode may impact this containment failure, although the weighting factors did not reflect such dependence.

The uncertainty in the vessel failure mode arises from the lack of experimental data indicating how a reactor core would melt. There is no consensus among source term experts as to how rapidly core debris accumulates in the lower plenum. In addition, the quantity of debris which must accumulate before the vessel pressure boundary is breached is not known. The complex geometry within the BWR vessel makes this issue even more uncertain than for PWRs.

There was considerable discussion of the physical conditions associated with this issue. One participant reviewed Oak Ridge calculations relevant to this issue [8]. The debris bed model used in the Oak Ridge work (and the STCP) predicts that when the core debris reached the lower plenum, there is enough water to lower the temperature to 2450°F at the time of dryout. As the core heats back up due to decay heating with no water present, the stainless steel at the penetrations is assumed to melt-through. The melt is not ejected, because at the time of melt-through the bulk of the core is solid (melting temperature of the core debris is assumed to be more than 1000° F higher than that of steel). One can postulate that there will be many small holes that will open up and these will reduce the pressure, but the pressure reduction will occur with much smaller holes than what would be needed to get significant core ejection. The pressure in the vessel is therefore decreased before the core becomes molten again. There are significant uncertainties in the analysis due to the lack of experimental data. Code limitations also make it difficult to represent a postulated melt-progression scenario. The key steps of the code calculations are determined by user input; for example, the timing of drop into the lower plenum is a single step that is determined by bulk core parameters. The actual modeling of the melt progression involves the following steps: (1) relocation of the stainless steel in the control blades to the core plate, (2) relocation of the channel box material and core to the core plate, (3) localized failure of the core plate when a particular radial zone reaches 1275°F which results in drop of all material in that zone into the lower plenum, (4) continued heating of the core, which is then slumped into the lower plenum one radial zone at a time. This model is highly simplified and uncertain and the actual progression of the melt is unknown, hence the vessel melt-through phenomenon is difficult to predict.

A different model of the core-melt process was also proposed and several reviewers stated their belief that it was quite possible. Instead of the progression of the melt described above, the heat source at the lower core plate could be radiated to the water below, resulting in a great deal of natural circulation and cooling, up to the time when the water is gone. The core plate would then fail and the core would slump en masse into the lower plenum. This model differs from the other discussed above because more of the core is potentially melted at the time of slump, and the average temperature of the debris on the bottom head and guide tubes is considerably higher. Unfortunately, the implications of this model difference relative to the type of melt-through is not certain. However, some reviewers felt that the STCP model may approximate this process. Another reviewer noted that the zirconium and zirconium oxide would change the melting temperatures of the mixture through the formation of eutectics. The exact nature of the mixture is highly uncertain, but the Zr that did mix with the molten core material would lower the melting point, perhaps significantly. Another reviewer pointed out the problems with consistency in the models, particularly with respect to potential stratification of the components of the melt. In the picture presented by the Oak Ridge calculations, the oxides are solid at the time of vessel failure, and they are at the bottom of the mixture. In another representation that is more consistent with other modeling of melted core debris, the oxides would be on the top.

One of the reviewers expressed strong sentiment that the slump mode of vessel failure was appropriate. (Although that reviewer's weights do not seem to coincide with the argument presented.) This reviewer argued that if the debris bed did indeed solidify in the lower plenum (as a result of contact with water), it would form a crust on the vessel and control rod guide tubes. He argued that this crust would be cooler than the debris which would subsequently be deposited in the lower plenum. This crust would serve to insulate the steel of the vessel from molten debris which formed (due to decay heating) within the crust. A substantial fraction of the core debris may have to be molten before the crust would be penetrated under this scenario. Thus the reviewer's model would lead to what is called the slump model in this analysis; even though a gradual progression of debris into the lower plenum may be assumed.

Other reviewers expressed their opinions that the slump model was almost certainly inappropriate. (Again, the weighting factors do not appear to reflect the persuasiveness of their arguments). These reviewers pointed out that the molten core debris would be 1500 -1800°F hotter than the melting temperature of steel. Thus even small quantities would melt the vessel, or penetration weld, steel upon contact.

Table A-7 lists the probabilities provided by the reviewers. The weighting factors indicate an approximately even split between the two meltthrough modes of vessel breach, although a number of individual reviewers thought that gross meltthrough was less likely, as indicated by weighting factors in the 0.1 to 0.3 range.

Table A-7

VESSEL FAILURE MODE FOR HIGH PRESSURE SEQUENCES

Outcome	Probability for Each Reviewer								
	1	2	3	4	5	6	7	8	Composite
1. Localized Meltthrough	0.4	0.4	0.5	0.7	0.8	0.9	0.7	0.3	0.6
2. Slump Melt (STCP)	0.6	0.6	0.5	0.3	0.2	0.1	0.3	0.7	0.4

Reviewer #1 stated that the modeling of core debris that identifies failure of a few welds that depressurize the vessel is beyond the state of the art, and probably optimistic. In addition, it was his view that the amount of core debris frozen at the time of melt-through would be relatively small because of decay heat and Zr oxidation. The next two reviewers thought that the issue was uncertain enough that the probability was essentially equal. Several of the other reviewers thought that the depressurization without ejection was more likely, principally because the timing of the process could lead to opening of small holes that would depressurized the system before ejection occurred. The last reviewer was most influenced by his belief that massive failure of welds in the bottom head would result once they started heating up. He was also familiar with experiments dropping molten material onto flat plates which showed that large holes opened very quickly once the plates were breached by small holes.

As with the other issues that required a probability as input, the issue was treated with a binary outcome: one case always has a slump meltthrough typified by the STCP, while the other case is a localized meltthrough typified by the MAAP model. The mean of the reviewers' responses was used (approximately), resulting in the assignment of 0.5 as a fraction of sample members in which a slump melt would occur.

A.10 CONTAINMENT PRESSURE PRIOR TO VESSEL BREACH FOR LONG-TERM STATION BLACKOUT SCENARIOS

The preliminary ASEP work on Peach Bottom core-melt scenarios identified the accidents involving a complete loss of ac power, the station blackout sequences, as the overwhelming contributor to core-melt frequency. Since the containment safeguards are not available for this scenario, the level of containment pressurization that occurs prior to the breach of the reactor vessel is important to risk since it will determine, in part, the peak pressure in the containment which is realized immediately after vessel breach This peak pressure determines the probability of containment failure. There are a number of uncertainties in the prediction of containment pressure rise during the in-vessel phase of the accident, including total heat generation, amount of hydrogen generated, the degassing of the drywell concrete and the timing of the sequence. Other boundary conditions that impact this pressure such as a stuck open relief valve are not part of this issue. Adjustments to the containment pressure to account for such boundary conditions are made within the containment event tree. This issue applies only for a long term sequence with assumed failure of dc power at 6 hours.

The STCP [9] calculations for Peach Bottom predict a containment pressure at vessel breach of 37 psig for long-term station blackout sequences. IDCOR calculations using MAAP indicate a pressure of 20 psig for the same sequence [7]. The difference between these two predictions is assumed to lie primarily in the amount of in-vessel hydrogen production which is predicted. Calculations using the MARCON code including modifications to account for degassing of concrete have estimated much higher pressures (62 psig) for a similar plant--Browns Ferry [8]. The levels selected for the LLH sensitivity analysis were based on the calculations above which indicated pressures from 20 to 62 psig.

The discussion of this issue centered on a number of phenomenon that are not fully included in all models: concrete degassing, hydrogen generation during core degradation, and heat transfer from the reactor vessel. For example, the difference between the 38 and 62 psig results are due to different models of all three of the phenomenon just listed. The hydrogen generation was different between the two results--25% of the core inventory of zirconium being oxidized for the 37 psig calculation and 45% for the 62 psig result using MARCON. It was generally concluded that the 45% value for hydrogen would probably be near the top of the range.

The timing of the accident sequence was also discussed since it plays a role in the heatup calculations. There is uncertainty in this, since the battery failure which nominally occurs at six hours could reasonably occur in a range of three to nine hours. A longer time before failure could lead to significantly higher pressures. For treatment of this issue, the reviewers were asked to supply a value for a six hour sequence. No variation in this timing was considered in the current analysis.

Table A-8 lists the range of weighting factor assignments on this issue for the long-term blackout accidents. It was generally concluded that the low value represented by level 1 was unrealistic due to the very low values (in the opinion of this review group) for all causes of pressure increase (primarily hydrogen generation) used in the IDCOR analysis (which was the basis for level 1). The 10-20% weight for this case accounts for the uncertainty in hydrogen that would lead to pressure values between 20 and 38 psig. Most of the reviewers assigned their largest weighting factor to the STCP value (designated as 38 psi). It was also a general conclusion that values higher than 62 psig would not be expected, and no other calculations applicable to this case would point to pressures that high. At least one reviewer discounted the degassing, feeling that core/concrete testing has indicating that degassing is depressed due to pressure. The reviewers also believed that the heating from the vessel would be as important as the degassing and that the 38 psi could be somewhat low for that reason.

This issue was only considered for long-term station blackout accidents (TB damage states). For the short-term accidents, heating of the containment and concrete degassing are not significant contributors to pressurization. The uncertainties in hydrogen generation were assessed by the SARRP analysts to have only a minor impact on the containment failure probability for the short-term blackouts, and thus the containment pressure prior to vessel breach was not sampled for these damage states. (On the basis of hand calculations based on the STCP results, the value was set at 35 psig.) In the initial ASEP assessment the TB damage state was a significant contributor to the total core-damage frequency. In the reevaluation used as the basis for this report (which uses a modified success criterion for the emergency service water system), the TB damage state is far less significant.

Table A-8

REVIEWER INPUT FOR CONTAINMENT PRESSURE PRIOR TO VESSEL BREACH FOR LONG-TERM STATION BLACKOUT

Containment Pressure	Weighting Factors									
		Reviewer								
	SARRP	1	2	3	4	5	6	7	8	Composite
1. 20 psig	.1	.05	.2	.1	.2	.15	0.0	.2	.01	.11
2. 38 psig	.4	.7	.4	.2	.75	.5	.5	.4	.95	.55
3. 62 psig	.5	.25	.3	.6	.05	.35	.5	.4	.04	.31
4. 80 psig	0.0	0.0	.1	.1	0.0	0.0	0.0	0.0	0.0	.03

A.11 CONTAINMENT PRESSURE RISE AT VESSEL BREACH

There are a number of uncertainties associated with the estimated pressure rise in the containment which results from meltthrough of the RPV when it is at high pressure. The most significant of these are:

(1) The temperature of the gases expelled from the RPV;

(2) The extent of direct containment heating by the dispersal;

(3) The quantity of hydrogen in the vessel at the time of vessel breach (related to the in-vessel hydrogen generation rate);

(4) The efficacy of the suppression pool in cooling the ejected gases; and

(5) The quantity of steam and hydrogen generated from quenching of the core debris in water on the drywell floor.

There are also uncertainties in the containment pressure rise resulting from meltthrough of the RPV when it is at low pressure and there is water on the drywell floor (such as would result from the operation of the drywell sprays). For a low pressure meltthrough, the fifth area of uncertainty listed above is predominant.

As originally posed to the expert reviewers, this issue considered six cases which dealt with the five areas of uncertainty in combinations that were relevant to the Peach Bottom containment analysis. The cases are listed in Table A-9. Only one of these cases, the first, was sampled in the limited issue sampling for this study. The other cases proved to have relatively minor impact on the containment performance (given the large uncertainty attributable to the issue of drywell meltthrough discussed below) or because the postulated preconditions were not likely.

Table A-9
BOUNDARY CONDITIONS FOR PRESSURE RISE AT VESSEL BREACH

Case	Boundary Conditions			
	RCS Pressure	Drywell Floor	Direct Heating	Suppression Pool Bypass
1	High	Dry*	No	No
2	Low	Wet	No	No
3	High	Dry	Yes	No
4	High	Dry	No	Yes
5	Low	Wet	No	Yes
6	High	Dry	Yes	Yes

*The drywell sumps may contain water and the resultant pressure increase associated with sump water is included as a separate sub-issue discussed later in this section.

The available calculations on this issue indicate considerable uncertainty, even without including direct heating pressure increments or other phenomenon such as suppression pool bypass. The results of these calculations are listed below:

Pressure Rise	Source
32 psi	SASA calculation for Browns Ferry [10]
80 psi	Battelle calculation for Peach Bottom, sequence TB1 [9]
40 psi	IDCOR Peach Bottom analysis [8]

There was considerable confusion during the discussion of this issue. The pressure rise which was attributed to the MARCON calculation (32 psi) could only result from the rather gradual blowdown of the RPV coupled with highly efficient condensation of the steam releases on structures in the drywell. Heating of the containment atmosphere was relatively small (based on the peak pressure obtained) when considered in the light of the very high temperatures of the gases (steam and hydrogen) released from the vessel. Even so, the stated pressure rise is relatively small. It is possible that this pressure rise, which was quoted to the SARRP analyst (over the telephone) by one of the researchers at Oak Ridge, was limited by leakage from the containment; however, the reviewer from Oak Ridge did not identify the 32 psi value as being erroneous.

In presenting the STCP result (80 psi pressure rise), the SARRP analyst informed the reviewers that hand calculations using the quantities and temperatures of gas calculated to be present in the STCP could not reproduce the peak pressures obtained by the STCP. Rather the hand calculation obtained a value of 45 psi. The reviewers apparently gave considerable credence to this hand calculation, believing that the STCP result could have been inaccurate. The SARRP analyst reviewed his hand calculation subsequent to the meeting. The discrepancy between the STCP pressure rise and that calculated by hand appears to be associated with the STCP calculation of drywell temperature. In the hand calculation, the drywell atmosphere temperature was estimated to be 2500°F following the blowdown of the RPV. The corresponding pressure rise was estimated to be approximately 80 psi (close to the STCP value). However, the drywell atmosphere temperature reportedly obtained from the STCP calculation [9] was about 340°F. When the hand calculation results were adjusted for to correspond to this final temperature, the estimated pressure rise was reduced by a factor of 1, to approximately 45 psi. Recently performed MELCOR calculations [11] suggest that the STCP appropriately calculated the pressure rise (given the conditions immediately prior to vessel breach) but that the reported temperature increase may be inaccurate.

The IDCOR result was not discussed in detail. However, given that this calculation includes a much lower inventory of hydrogen in the vessel at vessel breach at the time of failure, the stated value appears consistent with the STCP result.

To summarize the above discussion, the experts were almost certainly not presented with a clear representation of the available information. It is judged that the weighting factor assignments would change considerably if the experts were repolled. The discussion that follows is based on the original presentation of this issue at the review meeting

Only the first case of this issue was retained in the LLH. This case assumes that the RPV is at high pressure, the drywell floor is dry, and that the drywell vent downcomers are still submerged in the suppression pool. In the central estimate quantification of the CET, it is this case which is the predominant cause of containment overpressurization failure at vessel breach. The pressure increase associated with this case is due primarily to the introduction of hydrogen at high temperature into the drywell. The first level corresponds to the value derived from the MARCON calculation, while the most recent Battelle analyses result in pressures similar to level 2. There are several differences between the codes in calculation of the pressure rise, for example in the consideration of the volume of the vessel which results in a 10% addition to the drywell volume. The lower value also accounts for steam condensation during the blowdown. While the individual responses vary considerably for this issue, they only really vary between levels 1 and 2 and the total uncertainty is therefore not assessed to be too significant. The individual weighting factors were simply determined by each analyst's view of which code calculation was more realistic. The weighting factors assigned by the reviewers for this case are presented in Table A-10.

The uncertainty in pressure rise indicated by the reviewers' responses is not large in comparison to the uncertainty in containment failure pressure. In fact, the entire range represented is less than one-half of the range of uncertainty in containment failure pressure (about 70 psi). Thus it is not surprising that this issue, as it was sampled, has little impact on the uncertainty in risk.

In spite of the fact that the other cases were not considered in the LLH, the input is retained here for reference. The second case involves a wet drywell, caused by operation of the sprays. The drywell floor would be covered with 12 to 18 inches of water in this case. Since the vessel is depressurized the pressure increment results from steam spikes or steam explosions as the core debris drops into the water. The issue only includes the instantaneous pressure rise, not the longer-term steam generation which may result from decay heat produced in the debris. Because the dominant sequence in this case is an ATWS, the suppression pool temperature is generally greater than 100°C (212°F), however it is not saturated since the containment pressure is greater than one atmosphere. Reviewer #7 based his result on the steam generation due to gravity flow of the melted core out of the vessel and quenching as the core reaches the water. The pressure rise would not be substantial since the suppression pool would condense most of the steam generated. The pressure addition from his calculations (of a 30 centimeter hole gravity drop) would be less than a fifth of the design basis accident, so it would appear unlikely that the pressure rise would exceed the capability of the suppression pool, even at increased temperatures. The only way that larger pressure increments than level 1 would be seen would be for a large, coherent steam explosion to occur. This would be unlikely because of the limited depth of water on the drywell floor. Several reviewers pointed out that there would also be an increment due to hydrogen gas generation when the core debris (containing unoxidized zirconium) hit the water.

The general conclusion for case 2 was that the value would be less than the level 1 value. Because of this and the weighting factors it was determined that this case was a non-issue for the LLH study because it is neither important to risk nor particularly uncertain.

Case 3 accounts for direct heating with other boundary conditions the same as case 1. Once again, the uncertainties in this case involve:

- The timing of the pressure rise and whether or not the vents have time to clear for pressure suppression, and
- The amount of material distributed in containment, as affected by physical structures and the properties of the core melt.

Direct heating in a BWR involves more uncertainty relative to pressure rise because the effectiveness of the suppression pool is not fully understood for rapid pressure increases which could be induced by direct heating of the atmosphere (plus hydrogen generation). The estimates made by the SARRP analysts indicate that a rapid pressure rise that does not allow for clearing of the drywell vents can lead to a total pressure of 70 to 190 psi. The upper limit is associated with full core participation throughout the airspace. A variation in pressure increase is associated with the estimated participation of core debris. It is noted that the assumption that the drywell vents will not clear may be inappropriate. The reviewers stated a belief that the blowdown of the RPV and ejection of core debris would occur over a period on the order of ten seconds. The design basis event for the pressurization of containment is a LOCA involving blowdown of the RPV inventory of water over a similar (perhaps slightly longer) time period. The rate of energy addition to the containment for the LOCA is expected to be larger than that

Table A-10
WEIGHTING FACTORS FOR PRESSURE RISE AT VESSEL BREACH

Case and Pressure Increment		Weighting Factors								
			Reviewer							Composite
		SARRP	1	2	3	4	5	6	7	
CASE 1.	– High RCS Pressure – Drywell Floor Dry – No Direct Heating – No Suppression Pool Bypass									
0.	15 psi	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.	30 psi	.1	.2	.2	.9	.2	.3	.9	.2	.41
2.	45 psi	.7	.6	.6	.1	.7	.6	.1	.5	.46
3.	60 psi	.2	.2	.2	0.0	.1	.1	0.0	.3	.13
4.	75 psi	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.	120 psi	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASE 2.	– Low RCS Pressure – Drywell Floor Wet – No Direct Heating – No Suppression Pool Bypass									
0.	15 psi	0.0	0.0	0.0	0.0	.9	.1	0.0	0.0	.14
1.	30 psi	.4	.9	1.0	1.0	.1	.9	1.0	.9	.83
2.	45 psi	.4	.1	0.0	0.0	0.0	0.0	0.0	.1	.03
3.	60 psi	.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.	75 psi	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.	120 psi	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASE 3	– High RCS Pressure – Drywell Floor Dry – Direct Heating – No Suppression Pool Bypass									
1.	30 psi	0.0	0.0	.1	.1	0.0	0.0	0.0	.1	.04
2.	45 psi	0.0	0.0	.5	.3	.1	0.0	.3	.5	.24
3.	60 psi	.1	.3	.3	.3	.2	.3	.5	.4	.33
4.	75 psi	.2	.4	.1	.3	.3	.3	.2	0.0	.23
5.	120 psi	.7	.3	0.0	0.0	.4	.4	0.0	0.0	.16

Table A-10 (Continued)
WEIGHTING FACTORS FOR PRESSURE RISE AT VESSEL BREACH

	Case and Pressure Increment		Weighting Factors							
			Reviewer							Composite
		SARRP	1	2	3	4	5	6	7	
CASE 4.	– High RCS Pressure – Drywell Floor Dry – No Direct Heating – Complete Suppression Pool Bypass									
	1. 30 psi	0.0	0.0	0.0	–	0.0	0.0	–	–	–
	2. 45 psi	.1	0.0	0.0	–	0.0	0.0	–	–	–
	3. 60 psi	.1	.1	.05	–	.09	.15	–	–	.11
	4. 75 psi	.5	.7	.9	–	.9	.8	–	–	.83
	5. 120 psi	.3	.2	.05	–	.1	.05	–	–	.06
CASE 5.	– Low RCS Pressure – Drywell Floor Wet – No Direct Heating – Complete Suppression Pool Bypass									
	0. 15 psi	0.0	0.0	0.0	–	.9	.1	–	–	.25
	1. 30 psi	.1	.9	.05	–	.1	.9	–	–	.49
	2. 45 psi	.2	.1	.1	–	0.0	0.0	–	–	.05
	3. 60 psi	.3	0.0	.2	–	0.0	0.0	–	–	.05
	4. 75 psi	.4	0.0	.6	–	0.0	0.0	–	–	.15
	5. 120 psi	0.0	0.0	.05	–	0.0	0.0	–	–	.01
CASE 6	– High RCS Pressure – Drywell Floor Dry – Direct Heating – Complete Suppression Pool Bypass									
	1. 30 psi	0.0	0.0	0.0	–	0.0	0.0	–	–	0.0
	2. 45 psi	0.0	0.0	0.0	–	0.0	0.0	–	–	0.0
	3. 60 psi	0.0	.8	0.0	–	.1	.1	–	–	.25
	4. 75 psi	.1	.2	.05	–	.2	.8	–	–	.31
	5. 120 psi	.9	0.0	.95	–	.7	.1	–	–	.44

for direct heating. Since the drywell vents clear within the first one to two seconds following the postulated pipe break in a LOCA, the vents should also clear in a direct heating event.

A pressurized core-melt ejection does not necessarily lead to full dispersal of the core. The BWR case is also different from the PWR situation (for which most available direct heating calculations apply) in that it is also very uncertain how much of the melt that is ejected will participate in drywell heating since the area below the vessel is small and very restrictive. There is approximately 80 tons of steel with substantial surface area that could restrict the movement of aerosols, and the exit from that area to the drywell is through a manway that would also restrict dispersal in the drywell atmosphere.

The results for this case are also listed in Table A-10. There was considerably more variability in the assigned weighting factors for this case than the others. Two of the reviewers had significant weights associated with the highest pressure level. Both of these individuals felt that there was a very strong possibility that the vents would not clear in time to reduce the pressure rise. The other reviewers generally weighted the lower levels more heavily, principally because of their opinion that the vents would clear. Comparing the results of some reviewers to case 1 indicates their opinion that the pressure rise associated with direct heating would be relatively minor. For example, Reviewer #7 thought that the vents would definitely clear and that thermal radiation to structures would absorb significant of heat from direct heating sources.

There was considerable disagreement on the second major uncertainty, the amount of core material distributed in containment. Some felt that the geometry below the vessel would preclude efficient distribution, while an equal number of others felt that the material being ejected would not be affected by the structures due to the particle size and the large energy associated with dispersal. The uncertainty in this issue is combined with other uncertainties such that individual sensitivities are not directly discernible from the weighting factors assigned.

The primary reason for the exclusion of this case from the LLH was that the preponderance of outcomes lead to containment failure at vessel breach. It was thus decided to modify the containment event tree such that direct heating, if it occurs, always results in containment failure. Therefore the slump-type melt versus the flow-type melt issue (Section A.9), which determines the preconditions for direct heating, becomes a surrogate issue for the importance of direct heating. The relative importance of direct heating to risk can be inferred from the results (presented in Section 5 of the main report) relative to the importance of the mode of vessel breach.

The weighting factors for the other cases are also listed in Table A-10. Cases 4 through 6 involve the same conditions as cases 1 through three, but there is a complete suppression pool bypass. Not all of the reviewers provided input for these case, feeling that these pressures could be derived from the first three cases by accounting for the pool bypass. Since suppression pool bypass at vessel breach was assessed to have negligible probability, no further consideration was given to these cases.

As described above, one part of this issue, steam and gas generation from the interaction of the core with water in the drywell sumps, was separated out since the available calculations generally had not included it. Calculations performed at ORNL on Browns Ferry using the MARCON code [8] have estimated that an additional 15 psi increment is possible for the boiloff of 500 gallons of water and the generation of additional hydrogen immediately after vessel breach. This water is present in the drywell sumps. At the time of the review meeting, it was assumed that the Peach Bottom sumps were similar to those at the Browns Ferry plant, which have a total capacity of 1000 gallons. Plant operators have no specific instructions as to when to use pumps to drain the sumps, other than to prevent them from overfilling. Thus the experts were requested to provide weights to the pressure rise assuming that 500 gallons of water would be present in the sumps. Subsequent to the review meeting, the SARRP analysts were informed by members of the Peach Bottom engineering staff (who were asked to review the CET) that the Peach Bottom sumps had approximately twice the capacity of those at Browns Ferry. No alteration has been made to the pressure rise levels to account for this difference.

The impact between core debris and water on the drywell floor is more critical if the sprays had been used (the ATWS sequences, for example) because there would be approximately ten thousand gallons of water present. These latter cases were already treated within cases 2 and 5 in Table A-10. This subissue involves the uncertainty in the pressure due to water in the sump, and the resulting pressure increments were added to cases 1, 3, 4 and 6 discussed above. These all involved a dry wetwell and did not account for this additional source of pressure.

The results of the weighting assignments for this issue are listed in Table A-11. Two cases were included depending on the status of the suppression pool. There was fairly good agreement in both cases that the pressure increment would be one of the lower levels, with most reviewers weighting levels 1 and 2 similarly to indicate a value between 5 and 15 psi. The values for the second case including suppression pool bypass show more weight on level 2, and increased potential for a 30 psi increment. A number of the reviewers had similar results for both cases on the premise that if the pressure was high it could be due to the generation of hydrogen which, they postulated, would be controlled by the surface area of the debris exposed to water, rather than the amount of water available.

Table A-11

CONTAINMENT PRESSURE RISE DUE TO INTERACTION OF CORE WITH THE DRYWELL SUMP WATER*

Containment Pressure Increment	SARRP	Weighting Factors Reviewer 1	2	3	4	5	6	7	Composite
With No Pool Bypass									
1. 5 psig	.2	.2	.5	.5	.2	.6	.3	.6	.41
2. 15 psig	.6	.5	.5	.5	.6	.4	.7	.4	.51
3. 30 psig	.2	.3	0.0	0.0	.2	0.0	0.0	0.0	.08
4. 45 psig	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
With Pool Bypass									
1. 5 psig	0.0	0.0	.5	.4	0.0	.6	0.0	.4	.27
2. 15 psig	0.0	.3	.5	.4	.5	.4	.4	.6	.44
3. 30 psig	.5	.5	0.0	.2	.5	0.0	.6	0.0	.26
4. 45 psig	.5	.2	0.0	0.0	0.0	0.0	0.0	0.0	.03

*The numbers in this table assume the sump has 500 gallons of water in it.

A.12 PROBABILITY OF DRYWELL SHELL MELTTHROUGH

This issue results from a suggestion by researchers at Oak Ridge and Brookhaven National Laboratories (ORNL and BNL) which proposes that the there is a potential for a large amount of molten core debris to come into direct contact with the steel shell of the drywell after vessel breach [12]. Their calculations indicate that this contact would result in melting of the steel, inducing containment leakage. In ORNL calculations, the metallic potion of the core is liquid at 2300°K and this molten material flows over the drywell floor (immediately following vessel failure), forming in a six-inch deep pool. This issue addresses the probability that the drywell integrity will be lost as a result of such a phenomenon. IDCOR calculations indicate a substantially lower temperature for the core debris which reaches the shell, but the assumed temperature of the melt was very low compared to estimates obtained from code calculations (STCP, MARCON, MELCOR) made by the NRC contractors.

Planned MELCOR calculations may also provide some insight relative to this issue. The MELCOR code models what has been labeled in this report as a flow-type melt progression. At vessel breach, MELCOR drops the fuel which is at or near the solidus temperature onto the pedestal floor and into the drywell sumps. Core debris drops from the the vessel to the floor over a two-hour time period, although this time period varies considerably depending on the values assigned to various code parameters. Because of the timing, there is the possibility that the erosion of the concrete could keep pace with the rate that core debris is added to the volume that has already left the vessel. (The concrete is 35% carbon dioxide by weight, therefore a volume occupied by the melt debris has the potential for being less than the volume of the concrete.) Under such conditions, the melt may not reach the steel wall of the drywell, or it may do so only after a significant fraction of the core-concrete releases have occurred. A late failure (after the bulk of the fission product release from the core-concrete interactions) has far less risk significance than a failure at vessel breach (which is the base assumption for the drywell meltthrough failure mode). (No MELCOR calculations have been performed to date which would be useful in further illuminating this issue.)

Another potential impediment to the progression of the melt across the drywell floor is the presence of the control rod drives and supporting I-beams below the vessel. While these structures are not currently modeled by MELCOR (or other codes), freezing of debris on these structures might reduce the rate at which the debris reaches the drywell floor. This could have implications with regard to both the erosion rate of the concrete as well as the rate at which the debris spreads across the floor. However, some of the experts noted that molten uranium dioxide (fuel) has the viscosity of water and would flow over these structure virtually unimpeded, leaving only a water-thin crust

The review group had differing views on the issue, some believing that the core material would quickly solidify after being deposited on the drywell floor while another had calculated a fairly constant temperature for the first hour due to oxidation of the zirconium in the melt. Others felt that the pressurized ejection would disperse the material well and it could cool on surfaces in the cavity and outside over the whole containment. In order to accommodate the boundary conditions that might effect this issue, the reviewer input was collected for four cases: 1) a slump-type melt as the STCP predicts, 2) a flow-type melt into a dry cavity, 3) a flow melt into a wet cavity and 4) a high-pressure ejection scenario.

The results for the review of this issue are shown in Table A-12. There was some variation in the probabilities assigned for this issue, but none of the reviewers thought that this failure mode was insignificant. Most of the reviewers thought that shell meltthrough failure was relatively likely for all cases. One reviewer felt that this failure mode was certain in all cases. All of the reviewers except two thought that drywell spray, or other supplies of water to the drywell floor might reduce the probability of meltthrough, but none believed that meltthrough failure would be precluded by the availability of water. The actual failure could be due to either direct melting of the steel or by creep rupture resulting from the combined effects of temperature or pressure. Because this case called for probabilities rather than weighting factors, a composite was used to determine the fraction of sample members to be assigned drywell failure from meltthrough (provided that the core debris was not quenched). Since the differences between the cases were not large, this uncertainty was represented by one issue and one-half of the sample members allow this failure while the other half preclude drywell meltthrough. This simplified approach ensured that a significant fraction of the sample members (fifty percent) did not involve a drywell meltthrough, allowing risk and containment failure probability to be evaluated and compared with and without this failure mode. The failure mode was treated as an early containment failure, although (as described in Section 5 of the main report) this assumption could overstate the risk implications of this failure mode.

Table A-12

PROBABILITY OF DRYWELL MELT-THROUGH

	Boundary Conditions	Probability of Drywell Meltthrough Reviewers						
		1	2	3	4	5	6	Composite
1.	Slump Melt	.9	.9	.9	.5	.5	1.0	.78
2.	Flow Melt, Dry Cavity	.3	.6	.6	.5	.5	1.0	.57
3.	Flow Melt, Wet Cavity	.3	.3	.2	.5	.3	0.9	.43
4.	High Pressure Ejection	.4	.9	.6	.5	.5	1.0	.65

A.13 PROBABILITY OF HYDROGEN BURNS IN REACTOR BUILDING SUFFICIENT TO CAUSE BYPASS

After containment failure, combustible gases (hydrogen and carbon monoxide) are released to the reactor building where they can burn when combustible mixtures with oxygen are obtained. Computer code calculations (using MARCH, HECTR and CONTAIN) performed as part of the SARRP program, indicated that combustion of these gases within the reactor building could produce pressure loadings several times greater than the design pressure. Since the reactor building may play an important role in fission product retention, principally by providing a volume in which aerosol deposition may occur, an energetic event large enough to cause structural failure and direct leakage paths to the environment is potentially risk significant. The experts cited two principal sources of uncertainty associated with this issue: 1) uncertainties to the rate of combustion (flame speed) of the gases and 2) uncertainty in the structural response following the burn. IDCOR calculations do not predict burning because of the low estimated rates of hydrogen and carbon monoxide production which do not result in the accumulation of combustible mixtures. The SARRP expert reviewers, however, believed that a combustible mixture would always form. Battelle calculations indicate many hydrogen burns that increase the average building leak rate to the atmosphere and thus lower the decontamination effect. Recent analyses at ORNL show hydrogen burns with relatively little associated pressure increase.

Peak pressures within the reactor building have been found to be dependent, in order of importance, on the assumed flame speed, the hydrogen concentration assumed necessary for ignition, and on the composition of gas flow from the containment to the reactor building. Based on the results calculated with HECTR, flame speeds greater than 4 m/s are required to bring peak pressures above the building design pressure. Experimental results show flame speeds in the range of 1 to 8 m/s for the steam concentrations of interest here. Given that there is usually a significant design margin in structures, (a factor of 1.2 to 1.5 is probably appropriate), it does appear that the building could fail close to the time of containment failure. The HECTR calculations also predict higher peak pressures from carbon monoxide which is predicted to be released shortly after core-concrete interactions begin.

Only two levels were assigned for the uncertainty analysis, making this an issue for selection of probabilities rather than weighting factors. The two levels correspond to no bypass and bypass significant enough to limit the residence time for fission product aerosols such that there is essentially no decontamination. The reviewers provided input for two sequence types, station blackout and ATWS.

The discussion at the meeting included a review of some SASA work done on Browns Ferry Plant using the CONTAIN and the HECTRE codes. These new calculations indicate significantly lower pressure rises than the Battelle calculations for similar sequences. These low pressures may be attributable to the finer nodalization of the volume. The Sandia work using HECTRE added other phenomena such as buoyancy, the fire system spray headers, more nodes in the model of the reactor building, and radiation heat transfer. The ignition threshold in all cases was 8%. The CONTAIN and HECTRE results agreed very well, within 1 psi for peak pressure in all cases. In fact, the peak pressures were always below 1 psi, a significant contrast with the Battelle calculations of 7 psi. It was pointed out that the results were preliminary and other sensitivities were to be studied, but it was also the opinion of the analysts that the basic results would not change. However, if flame speeds were assumed to have values at the high end of the experimentally observed range (6 -8 m/s), peak pressures close to those obtained by Battelle were again calculated.

One of the uncertainties is the burn model. Higher pressures could be expected if the hydrogen accumulated higher concentrations before burning, although the multi-compartment models would tend to indicate that large hydrogen concentrations would not accumulate. There was also one other concern about the applicability of the Browns Ferry results considered in the deliberations concerning this issue, since Browns Ferry does have almost ten times the area of blowout panels in the refueling bay. (The Browns Ferry reactor building structure surrounds all three units, whereas the Peach Bottom design looks more like a separate building for each unit.)

The resulting probability assignments are listed in Table A-13. The results indicate considerable differences among the reviewers. Those who did allow for significant bypass based their results on the possibility of a hydrogen buildup. One of the reviewers found the potential for major building damage to be nil. Since the inputs were not really distinct for the two cases, this issue was treated as a single issue with the sampling based on the composite of the reviewers' inputs. As with other issues involving probabilities, the representation of the uncertainties was maximized by having some of the sample members have no bypass and others have complete bypass. Thus, the probabilities assigned were used to assign complete bypass for 20% of the sample members. This was done since ATWS damage states have relatively small frequency in all of the LLH sample members.

It is noted that this issue is related to the source-term issue which is described in Section 5 of the main report and in Section B.1.8 of Appendix B. That issue considers the effective decontamination for the reactor building. One of the levels of the source-term issue allows for a value of unity, i.e., no decontamination in the reactor building. This level accounts for burns which reduce the residence times for aerosols in the reactor building to almost zero, without inducing structural failure.

Table A-13

REVIEWER INPUT FOR THE PROBABILITY OF HYDROGEN BURNS IN REACTOR BUILDING SUFFICIENT TO CAUSE BYPASS

Boundary Conditions	Probability of Reactor Building Bypass						
		Reviewer					
	SARRP	1	2	3	4	5	Composite
1. Station Blackout Suppression Pool Subcooled Low Steam Concentration	–	.4	.1	.6	0.0	.1	.3
2. ATWS Suppression Pool Saturated High Steam Concentration	–	.4	.1	.2	0.0	.1	.2

References for Appendix A

1. Amos, C. N., et al. *Containment Event Analysis for Postulated Severe Accidents: Peach Bottom, Unit 2*. U. S. Nuclear Regulatory Commission Report NUREG/CR-4700, Volume 3 (Draft Report for Review), Sandia National Laboratories, Albuquerque, NM: February, 1987.
2. Kolaczkowski, A. M., et al. *Analysis of Core Damage Frequency for Internal Events: Peach Bottom, Unit 2*. U. S. Nuclear Regulatory Commission Report NUREG/CR-4550, Volume 3 (Draft Report), Sandia National Laboratories, Albuquerque, NM: February, 1987.
3. Greimann,L., et al. *Final Report, Containment Analysis Techniques, A State-of-the-Art Summary*. U. S. Nuclear Regulatory Commission Report NUREG/CR-3653, Ames Laboratories, Ames, IA: March, 1984.
4. *Reactor Safety Study--An Assessment of Accident Risks in U.S. Commercial Nuclear Power Plants* U. S. Nuclear Regulatory Commission Report WASH-1400 (NUREG-75/014), Washington, DC: 1975.
5. Containment Performance Working Group. *Containment Leak Rate Estimates*. U. S. Nuclear Regulatory Commission Report NUREG-1037, Washington, DC: (Preliminary Draft, 1984)
6. Gieseke, J. A., et al. *Radionuclide Release Under Specific Accident Conditions*. Battelle Columbus Laboratories Report BMI-2104, Columbus, OH: 1984.
7. *IDCOR Task 23.1: Integrated Containment Analysis*. Technology for Energy Corporation, Knoxville, TN: 1984.
8. Ott, L. J., et al. "Station Blackout Calculations for Browns Ferry" *Proceedings of the USNRC 13th Light Water Reactor Safety Research Information Meeting*. U. S. Nuclear Regulatory Commission Report NUREG/CP-0072, Volume 1, Washington, DC: January, 1986.
9. Denning, R. S., et al. *Radionuclide Release Calculations for Selected Severe Accident Scenarios: BWR Mark I Design*. U. S. Nuclear Regulatory Commission Report NUREG/CR-4624, Volume 1, Battelle Laboratories, Columbus Division, Columbus, OH: July, 1986.
10. Harrington, R. M., et al. *Station Blackout at Browns Ferry Unit One - Accident Sequence Analysis* U. S. Nuclear Regulatory Commission Report NUREG/CR-3470, Oak Ridge National Laboratories, Oak Ridge, TN: July, 1984.
11. Shaffer, C. "MELCOR 1.6 Calculations for Vessel Depressurization in Mark I Containments" *Proceedings of the USNRC 14th Light Water Reactor Safety Research Information Meeting*. U. S. Nuclear Regulatory Commission, Washington, DC: 1986.
12. Greene, G. A., et al. "Mark I Containment Drywell: Impact of CCI on Containment Integrity and the Failure of the Drywell Liner" *Proceedings of the International Symposium on Source Term Evaluation for Accident Conditions, IAEA-SM-281/36, Columbus, OH* : October, 1986.

Appendix B

SUPPORTING ANALYSIS FOR THE PEACH BOTTOM SOURCE-TERM AND CONSEQUENCE ANALYSES

CONTENTS

Section Page

B.1 EXPERT INPUT FOR THE LLH SOURCE-TERM UNCERTAINTY ISSUES . B-1 -40
B.1.1 In-Vessel Release from the Fuel .... B-3 -42
B.1.2 Amount of CsI Decomposition .... B-7 -46
B.1.3 Retention in the Reactor Pressure Vessel .... B-8 -47
B.1.4 Suppression Pool Decontamination Factor for Aerosols .... B-11 -50
B.1.5 Suppression Pool Scrubbing of Volatile Iodine .... B-14 -53
B.1.6 Revolatilization Following Vessel Breach (FRVOL) .... B-16 -55
B.1.7 Release from the Melt During Core-Concrete Interactions .... B-17 -56
B.1.8 Reactor Building and Refueling Bay Decontamination Factors .... B-21 -60
B.1.9 Late Releases of Iodine .... B-26 -65
B.1.10 Other Issues B-26
B.2 METHODOLOGY FOR SOURCE TERM ESTIMATION .... B-28 -67
B.2.1 Interface Between Containment and Source-Term Analyses B-28
B.2.2 Source Term Code Package Calculations .... B-40 -79
B.2.3 Methodology for the Estimation of Source Terms: RELTRAC .... B-41 -80
B.2.4 Development of Source Terms for the Central Estimate .... B-45 -84
B.2.5 Development of Source Terms for LLH Analysis B-45
B.3 CLUSTERING OF PEACH BOTTOM SOURCE-TERM ESTIMATES .... B-49 -88
B.3.1 Introduction to the Clustering Process B-49
B.3.2 Clustering Procedure .... B-53 -92
B.4 RESULTS OF THE SOURCE-TERM ANALYSIS .... B-54 -93
B.4.1 Central Estimate Source-Term Results B-54
B.4.2 LLH Source Term Results B-54
B.5 RESULTS OF THE CONSEQUENCE ANALYSIS .... B-67 -106
B.5.1 Central Estimate Consequence Estimates B-67
B.5.2 LLH Consequence Estimates B-67
References for Appendix B .... B-76 -115

BEST COPY AVAILABLE

LIST OF TABLES

Table		Page
B-1	Preliminary Ranking of LLH Issues Relevant to Source Terms	B-3
B-2	Results of Sensitivity Studies for In-Vessel Release Fraction	B-4
B-3	In-Vessel Release Fraction for the Peach Bottom LLH Analysis	B-5
B-4	Levels and Weighting Factors for the In-Vessel Release from the Fuel	B-6
B-5	Levels and weighting Factors for CsI Decomposition	B-7
B-6	Central Values of Fractional release from the Vessel, Given Release From the Fuel, Based on STCP Analyses of BWRs	B-8
B-7	Levels for the Issue of In-Vessel Retention	B-10
B-8	Weighting Factors for In-Vessel Retention	B-11
B-9	Weighting Factors for Suppression Pool Scrubbing of Aerosols	B-14
B-10	Suppression Pool Scrubbing of Volatile Iodine Species	B-15
B-11	Revolatilization from the RPV Following Vessel Breach	B-17
B-12	Ranges of Calculated Results for CCI Releases	B-18
B-13	Values of FCCI/(1-FCOR) For the Study of CCI Release Uncertainties	B-21
B-14	Weighting Factors for Core-Concrete Interaction Releases	B-21
B-15	Decontamination Associated With Holdup and Deposition in the Reactor Building	B-25
B-16	Decontamination Factors for Releases That Go Directly to the Refueling Bay	B-25
B-17	Levels and Weighting Factors for Late Sources of Iodine	B-26
B-18	Values of Release Fractions for High Pressure Ejection	B-27
B-19	Accident-Progression Bin Parameters and Their Impact in RELTRAC	B-30
B-20	Definition of the Accident-Progression Bins	B-32
B-21	Definition of the 10-Dimension Accident-Progression Bins	B-36
B-22	Cross Reference of 10-Dimension Bins with 22-Dimension Central Bins	B-38
B-23	Early and Late Effect Weights of the Source Term Groups	B-54
B-24	Cross Reference of Central Estimate Bin Numbers with 22-Dimension Bins	B-55
B-25	Central Estimate Release Fractions for MACCS Consequence Calculations	B-56
B-26	Central Estimate Release Fractions for CRAC2 Calculations	B-60
B-27	Peach Bottom Cluster Release Fractions for MACCS	B-62
B-28	Peach Bottom Cluster Release Fractions for CRAC2	B-65
B-29	MACCS Estimates of Mean Consequences for Central Estimate Bins	B-68
B-30	CRAC2 Estimates of Mean Consequences for Central Estimate Bins	B-70
B-31	MACCS Estimates of Mean Consequences for LLH Clusters	B-71
B-32	CRAC2 Estimates of Mean Consequences for LLH Clusters	B-74

39

B.1 EXPERT INPUT FOR THE LLH SOURCE-TERM UNCERTAINTY ISSUES

The STCP served as the principal tool for evaluating the source terms for postulated severe accidents. However, source terms could not be calculated with the STCP for all of the accident-progression bins which were identified in the containment analysis as having significant frequency. In addition, the models of the STCP are known to involve both considerable uncertainty and limitations relative to modeling some specific phenomena. The uncertainties thought to be most important were therefore treated as issues in the LLH framework outlined in Section 2 of the main report. Some of the uncertainties involve parts of the source-term calculation as performed within the STCP while others address the limitations of the STCP by considering phenomena that are not currently included in the STCP, but which may be risk-significant. It is difficult to treat all of the uncertainties that enter into source-term assessment in an explicit manner since that would require examination of radionuclide for many time regimes and considering many boundary conditions.

The issues that are used as the basic unit of uncertainty in the LLH study are not necessarily limited to one unique phenomenon, but rather refer to all uncertainties in our understanding of physical processes that result in a particular outcome or effect. For example, the issue of in-vessel retention includes all of the chemical and physical processes of retention and resuspension, as well as individual phenomenon associated with particular radionuclides. Unfortunately, some of the detailed insights are lost in this process and the weighting factors may include compromises that best suit the broader interpretation of the issue, but practical limitations precluded more detailed treatment. Much of the technical input concerning this greater level of detail has been maintained and is discussed in this section.

The review group for the Peach Bottom source-term study included:[*]

•	D. Williams	Sandia National Laboratories	Principal SARRP analyst
•	J. Gieseke	Battelle Columbus Laboratories	
•	T. Kress	Oak Ridge National Laboratories	
•	D. Powers	Sandia National Laboratories	
•	R. Denning	Battelle Columbus Laboratories	
•	C. Amos	Technadyne	
•	M. Khatib	Brookhaven National Laboratory	

The radiological source term issues were included in the LLH analysis of Peach Bottom are listed below:

---

[*] The reviewers are identified by number only in the discussion that follows. The order of participants listed is not the same as the order of reviewers identified in the tables.

(1) Magnitude of in-vessel release from the fuel,
(2) Amount of CsI decomposition in the RPV,
(3) Amount of RPV retention,
(4) Suppression pool decontamination factor for aerosols,
(5) Suppression pool scrubbing of volatile iodine,
(6) Revolatilization of iodine and cesium from vessel following vessel breach,
(7) Releases from the melt during core-concrete interactions,
(8) Reactor building and refueling bay decontamination factors, and
(9) Late releases of iodine from the suppression pool.

Each of these issues is defined in the sections that follow. The input of the expert review group is also provided for most of the issues to illustrate the range of inputs assessed in the LLH study. For each issue, one of the distinct levels, or sets of outcomes, was constrained to be that which would be obtained using the STCP, if applicable. Thus the weighting factors help to illustrate the view of the experts concerning the uncertainty in the STCP in modeling the particular issues. Section B.2 describes the implementation of the these inputs in the source-term portion of the risk calculation. The implementation is a particularly important concern for Peach Bottom, because, as described in Section 2 of the main report, the methodology for this plant was considerably more complex and detailed than for the other SARRP reference plants.

The first step in the review process was a ranking of the proposed issues with regard to expected importance and a review of the issues for completeness in the opinion of the review team. The intent of the ranking was to list the issues in order of overall importance to both the source-term analysis and the Peach Bottom risk, although in some cases the reviewers did not have full knowledge of the other inputs (sequence results, etc.) and the ranking tends to be a relative ranking of importance to the source-term analysis. These rankings were requested to help the SARRP team set priorities in case the practical limitations of the study forced a reduction in the number of issues to be included. Nine issues were ranked on a simple three-point scale of importance, with those ranked with a "1" being most important. The results of this ranking are included in Table B-1. It should be noted that this ranking was performed prior to the assessment of these issues in the risk model, and are therefore not indicative of the actual calculated importance to risk or uncertainty for Peach Bottom. Discussion of the issues is provided in the following sections which include definitions for each issue, the weighting factors selected by the review group and other information concerning the importance of the issue to the analysis of Peach Bottom.

Table B-1

PRELIMINARY RANKING OF LLH ISSUES RELEVANT TO SOURCE TERMS

	Issue				Priority Reviewer				
		SARRP	1	2	3	4	5	6	Composite
1.	In-Vessel Release From Fuel	2	2	2	1	2	1	1	1.5
2.	CsI Decomposition	2	1	1	2	1	1	1	1.2
3.	In-Vessel Retention (FVES)	1	1	1	1	1	1	1	1.0
4.	Suppression Pool Scrubbing DF for Aerosols	1	2	1	1	1	1	1	1.2
5.	Scrubbing of Volatile Iodine Species	2	2	1	2	1	1	2	1.5
6.	Revolatilization From the Primary System Following Vessel Breach	1	1	1	1	1	1	1	1.0
7.	Release from the Melt During Core-Concrete Interactions (CCI)	1	1	1	1	1	1	1	1.0
8.	Retention in the Reactor Building and Refueling Bay	1	1	1	1	1	1	1	1.0
9.	Late Release of Iodine From Containment	2	2	1	2	1	2	1	1.5

B.1.1 In-Vessel Release from the Fuel

This issue is essentially the same as studied for the other plants, although the individual uncertainties represented can be affected by the specific plant design. There are a number of uncertainties associated with the estimated releases from the fuel during the melting of the core in the reactor vessel. The models of the radionuclide releases are uncertain due to a lack of experimental evidence and data, and complexity in applying the available data to a model of the process considering all possible boundary conditions and external effects. The thermal-hydraulic factors most affecting the fraction of the initial core inventory of a species released in-vessel, such as core thermal history, also cannot be assessed with great accuracy.

To review the issue, two types of uncertainty were assumed to affect the release from the fuel: (1) uncertainty in the core thermal history, with conditions resulting in high core temperatures and maximum times at high temperatures favoring the high values of release from the fuel and (2) the uncertainty that associated with the release of the fission products at a given temperature, as calculated by the CORSOR-M code [1].

The uncertainty in the release model due to temperature effects has been addressed by Battelle for a Peach Bottom ATWS sequence (TC1)[2]. The uncertainties in the release rate were addressed by varying the release rate coefficient for each species by a factor of ten in either direction from the base case. The uncertainties considered in this study do not include the impact of thermal-hydraulic modeling uncertainties which also have an important effect on the release rates via the predicted thermal history of the fuel. The results of these sensitivity studies for the one sequence (TC1) are listed in Table B-2 below. The table also includes the base case results for other sequences to illustrate the variation caused by sequence dependence compared to the phenomenological uncertainty variation.

As illustrated in the table, the apparent uncertainty in the tellurium and barium releases is quite significant. For the volatile species, the releases are generally high and only a factor of two variation was seen in the sensitivity analysis. These uncertainties only reflect the CORSOR modeling, not the potentially significant uncertainties in thermal-hydraulic history studied in the QUEST program. The ranges are smaller than the results seen in the sensitivity studies for Surry [3] which provided input for the uncertainty in this same issue for the PWR plants studied in SARRP. It is worth noting that the principal risk-significance of this issue is likely to be that a low value for the volatile species (Cs and I) may substantially enhance the source term for these species for accident progressions involving core-concrete interactions, since most releases from the vessel are scrubbed in the suppression pool while releases due to CCI are not scrubbed in these scenarios. This is true since it is certain that CCI will release all volatile species present in the core debris at vessel breach. In view of this fact, plus the fact that the Battelle sensitivity study was relatively limited, it was decided to include somewhat lower in-vessel release fractions in the LLH range than those reported above. In QUEST, values as low as 0.13 were obtained for these species in Surry (the Surry sensitivities included both release rate and thermal hydraulic uncertainties), even though the central values (between 0.98 and 0.99) were higher than any of the central values given above.

Table B-2

RESULTS OF SENSITIVITY ANALYSES FOR IN VESSEL RELEASE FRACTION

Species			Sequence			
		TC1		TC2 & TC3	TB1 & TB2	V
	Low	High	Central	Central	Central	Central
Xe, Kr	0.58	1.0	0.92	0.96	0.89	0.83
I	0.57	1.0	0.92	0.96	0.89	0.83
Cs	0.57	1.0	0.93	0.96	0.9	0.84
Te	0.05	0.76	0.3	0.69	0.38	0.12
Ba	0.001	0.1	0.01	0.01	0.02	0.01
Others	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

The Peach Bottom STCP results shown in Table B-2 also indicate that the in-vessel release fractions were calculated to vary with the sequence, although the variation is significantly less than that due to phenomenological uncertainty. Since the calculated variation between sequences is small compared to the assessed uncertainty in the results, one set of values was assumed to apply to all of the sequences in the LLH representation.

Values for the range of release fractions for each WASH-1400 fission product group were developed from the Battelle sensitivity study as well as from the results of the QUEST program [3]. The first three levels are based directly on the TC1 sensitivity study described above and the central estimates of the TB sequence. The only change was a small reduction in the values for the first level for Cs and I. The level 4 values were selected from the QUEST results for the Surry plant. This level was defined to correspond to the Surry level 3 values, which were based upon QUEST results in which the thermal-hydraulic conditions were varied to maximize release but the release-rate coefficients were left at their base case values. (In the original strawman proposal to the review group, the level 4 values were derived from the Surry level 4 values. The reviewers thought that those values were too extreme for Peach Bottom, and suggested the level 3 values be used instead.) The resulting refractory releases are still considerably higher than any obtained in the more recent Peach Bottom study alluded to above, primarily because of differences between the older CORSOR version used in QUEST and the newer CORSOR-M, which is currently incorporated into the STCP and was used in the Peach Bottom sensitivity study. These level 4 values are included to allow the possibility of very high in-vessel release fractions due to sources of uncertainty not addressed in the Battelle sensitivity study for Peach Bottom. The values for each of the levels are reproduced in Table B-3.

Table B-3

IN-VESSEL RELEASE FRACTIONS FOR THE PEACH BOTTOM LLH ANALYSIS

Release Group	Level 1 Low	Level 2 Base	Level 3 High	Level 4 High-High
1-3: Xe ,Kr, I, Cs	0.5	0.89	1.0	1.0
4: Te	0.05	0.38	0.76	0.9
5: Sr	5.5×10^{-5}	5.9×10^{-4}	5.8×10^{-3}	0.49
6: Ru	7.6×10^{-8}	7.8×10^{-7}	8.2×10^{-6}	0.11
7: La	7.6×10^{-9}	8.5×10^{-8}	8.3×10^{-7}	0.0077
9: Ba	0.001	0.02	0.10	0.49

The weighting factors of the reviewers for each level are provided in Table B-4. The key points of the review meeting discussion are outlined below to allow an understanding of the primary considerations that the reviewers included in the development of their weighting factors, as well as limitations that might affect the interpretation of the results.

Table B-4

LEVELS AND WEIGHTING FACTORS FOR THE IN-VESSEL RELEASE FROM FUEL

FCOR Level		Weighting Factors Reviewer						
		1	2	3	4	5	6	Composite
1.	Low	0.04	0.1	0.2	0.4	0.25	0.4	0.23
2.	Base	0.48	0.6	0.45	0.5	0.35	0.55	0.49
3.	High	0.48	0.25	0.30	0.1	0.35	0.05	0.26
4.	High-High	0.0001	0.05	0.05	0.0	0.05	0.0	0.02

As noted above, the levels include discrete outcomes for each of the source-term groups. The reviewers weighted the STCP result most heavily, but also assigned significant and approximately equal weighting factors for the levels on either side of the base case. The most obvious result illustrated in the table is that it was the consensus that high release fractions associated with level 4 were unrealistic. None of the calculations performed for BWRs would indicate the potential for release that high, and several of the reviewers indicated that there were reasons for expecting lower releases than those represented by level 4.

In giving significant weight to the level 1 release fractions, the reviewers cited the possibility of an in-vessel melt progression which has been described previously as a flow-type melt (See Appendix A, Section 9). This picture of the melt progression assumes that fuel will relocate downward as the cladding melts. It could be postulated that this relocation reduces the time during which the fuel is exposed to extreme elevated temperatures, perhaps reducing the releases of volatile fission products. Further, this model for melt progression would allow for meltthrough of the vessel with low power fuel elements (on the periphery of the the core) intact and in place. This fuel may be postulated to degrade (melt), releasing fission products, after the vessel meltthrough. Even though this fuel would be in the vessel, the fission product releases would occur to the drywell and should be grouped with the ex-vessel (CCI) releases for correct treatment in the source-term model.

B.1.2 Amount of CsI Decomposition

This issue, which applies to all of the plants studied in SARRP, is concerned specifically with the iodine releases from the reactor vessel. The STCP assumes that all iodine will be present only as CsI. Recent experimental data indicate that, in the presence of steam and radiation (as in the RPV), CsI may tend to decompose (into CsOH and HI, for instance) resulting in the release of more volatile forms such as elemental iodine [4]. The more volatile forms would be expected, by the experts, to have negligible retention in the RPV. At this time, the evidence is not conclusive, and four outcomes, representing a distribution between 0.0 and 1.0 as the fraction of iodine that is released directly without retention (due to conversion to a more volatile state) were used in the LLH study. It should be noted that this issue does not include the rather large uncertainties associated with the retention of the iodine that is in the form of CsI; this is part of the next issue. This issue was assumed to have no efect on the net retention of Cs.

As illustrated by their weighting factors, shown in Table B-5, the reviewers thought that there was great uncertainty in this issue. One of the reviewers thought that the issue was less uncertain for BWRs; he stated that the BWR case is very different due to chemistry effects associated with the borated water (formed by oxidation of the boron carbide in the control blades) that would very likely cause high reaction rates of CsI with the boron and result in substantial conversion of the CsI. His weighting factors indicate that the conversion would be very effective, although probably not complete. The weighting factors provided by the other reviewers were driven by a lack of evidence to support any particular value, although this was expressed somewhat differently among the reviewers, with some giving very low weights to either end of the range.

Table B-5

LEVELS AND WEIGHTING FACTORS FOR CsI DECOMPOSITION

Decomposition Level	Weighting Factor Reviewer 1	2	3	4	5	6	Composite
1. 0.0	0.33	0.25	0.3	0.0	0.25	0.0	0.19
2. 0.33	0.34	0.25	0.6	0.7	0.25	0.1	0.37
3. 0.67	0.33	0.25	0.1	0.3	0.25	0.8	0.34
4. 1.0	0.0	0.25	0.0	0.0	0.25	0.1	0.10

B.1.3 Retention in the Reactor Pressure Vessel

There are significant uncertainties in our understanding of the physical processes of in-vessel retention, and there are also limitations in the current modeling capability which may introduce very significant uncertainty in the results. Representation of this issue as an uncertainty parameter is very complex, because it would be desirable to acknowledge the dependencies on the accident sequence, the individual fission-product group, and the fuel release, while further recognizing that the resulting correlations could be complex and unique for individual species.

In-vessel retention was recently re-evaluated by Battelle with the result that in-vessel retention had little impact on the results for all sequences except for sequences which bypass the containment, due primarily to the fact that the suppression pool scrubbing was calculated to be very efficient [2]. The uncertainties in in-vessel retention might become more significant when the other uncertainties such as pool bypass, low scrubbing efficiencies or revolatilization of initially-retained fission product compounds are considered. The base case estimates of these calculations are provided in Table B-6 for several types of sequences for both the Peach Bottom and Grand Gulf plants.

Table B-6

CENTRAL VALUES OF FRACTIONAL RELEASE FROM THE VESSEL, GIVEN RELEASE FROM THE FUEL, BASED ON STCP ANALYSES OF BWRs

Species	Plant/Sequence					
	Peach Bottom				Grand Gulf	
	TB1/TB2	TC1	TC2 & TC3	V	TC	TB
CsI	0.24	0.84	0.96	0.91	0.54	0.71
CsOH	0.16	0.83	0.82	0.88	0.56	0.54
Te	0.09	0.15	0.29	0.52	0.35	0.16
Ba	0.17	0.75	0.58	0.8	0.39	0.30
"Aerosol*"	0.14	0.78	0.62	0.75	0.46	0.35

* "Aerosol" refers to the release of all materials modeled as nonvolatile aerosols in the code package. These values were assumed to apply to all nonvolatile species not specifically addressed here--this is supported by a comparison of this category to the Ba releases.

It was thought by both the SARRP analysts and the expert review group that because Peach Bottom and Grand Gulf have very similar designs for the RPV, the results for in-vessel retention (for similar sequences) would be similar. While it may be observed in Table B-6 that there are differences between the results for the two plants, no explanation of the differences was offered at the expert review meeting. Two possibilities (not including possible differences in STCP input parameters) are: 1) Grand Gulf has a slightly higher core power density, and 2) the Grand Gulf RPV contains more water per unit mass of fuel. The latter difference could provide for a greater flow of steam though the vessel during core damage. Higher steam flow would reduce fission product residence time and thus the opportunity for retention.

For Peach Bottom, the retention calculated for TB is fairly high, while it is rather small in the other cases. For Grand Gulf the differences between the two sequences analyzed were not great. In this connection, it is noteworthy that the Peach Bottom retention factors do not correlate with the most obvious thermal-hydraulic parameter, system pressure: in the TB and TC2/TC3 cases, core melt occurs at close to system operating pressure while melt occurs at low pressure in TC1; meltdown occurs at intermediate pressures in the V sequence analyzed. During the review group's deliberations concerning Peach Bottom, it was noted that control rod drive pump flow was assumed to be present in the TC2/TC3 scenario, and that the enhanced steam flows and enhanced zirconium oxidation resulting could have played a role in keeping the retention low, despite the high system pressures. In the discussions that follow, this issue is treated in terms of the fraction of release from the fuel which is released from the reactor vessel. Thus a value of unity for this issue indicates that none of that particular fission product group remains in-vessel following deposition of the core debris on the drywell floor.

It must be acknowledged that the justification for the values of the fraction of a fission-product group released from the vessel (other than the level corresponding to STCP results) is weak since there is little supporting evidence. In any event, sensitivity to STCP modeling changes, input assumptions, and modeling uncertainties are clearly large and a wide range of values was therefore allowed for. Ideally, the weights and levels should be specified independently for each type of sequence. The levels used to represent the range are represented in Table B-7. The sequence dependence was addressed by developing two sets of levels, one for TB sequences and one for TC sequences. Because of the large uncertainties and lack of any evidence for selecting the levels, the two cases differ only in the level 3 results--the STCP central estimates. Thus, a belief that the differences between the the TC and TB calculations validly represents genuine differences between these sequences could be represented by assigning a substantial weight to level 3. On the other hand, a belief that these differences merely reflect the sensitivity of all the calculations to the various uncertainties afflicting them could be represented by assigning more weight to levels 2 and 4 than to level 3. The values for levels 2 and 4 are representative of the ranges of fractional release from the vessel predicted by the STCP: the TB values are assigned for level 2 while the TC values are assigned for level 4.

Recognizing the potential for values significantly different from any of those predicted by the code package, two additional levels were added to the range. The level 5 values were simply selected to represent very low retention factors, while the level 1 values were selected based on QUEST results and the Surry analysis, although it should be recognized that analyst judgment is essentially the sole justification of this level.

Table B-7

LEVELS FOR THE ISSUE OF IN-VESSEL RETENTION

Release Groups	Level 1	Level 2	Level 3	Level 4	Level 5
		Fractional Release from the Vessel for TB Scenarios			
2	0.04	0.24	0.24	0.90	.97
3	0.04	0.16	0.16	0.82	.97
4	0.02	0.09	0.09	0.22	.9
5, 6 & 7	0.02	0.14	0.14	0.70	.9
		Fractional Release from the Vessel for TC Scenarios			
2	0.04	0.24	0.90	0.90	.97
3	0.04	0.16	0.82	0.82	.97
4	0.02	0.09	0.22	0.22	.9
5, 6 & 7	0.02	0.14	0.70	0.70	.9

As indicated in Table B-8, the reviewers weighted levels of retention higher than the nominal STCP result (level 3) more heavily, particularly level 2. Reviewer #6 felt that retention would be higher than that calculated by TRAP-MELT because the effects of the complexity of the BWR vessel could not be calculated by the code. Reviewer #1 agreed, pointing out the potential for the steam dryers to trap significant fractions of the releases.

It was noted that the IDCOR MAAP code predicts high in-vessel retention. This retention was ascribed to the representation of natural circulation within the vessel. Circulating flow transports fission product vapors (principally CsI and CsOH) from the hot structures above the core to the relatively cool areas of the jet pumps in the downcomer, where they condense.

Table B-8
WEIGHTING FACTORS FOR IN-VESSEL RETENTION

Level	Weighting Factor Reviewer 1	2	3	4	5	6	Composite
1.	0.3	0.1	0.05	0.05	0.05	0.0	0.09
2.	0.6	0.2	0.3	0.25	0.3	0.7	0.39
3.	0.05	0.4	0.4	0.3	0.3	0.0	0.24
4.	0.05	0.2	0.2	0.3	0.3	0.3	0.23
5.	0.0	0.1	0.05	0.1	0.05	0.0	0.05

B.1.4 Suppression Pool Decontamination Factor for Aerosols

There is significant uncertainty associated with the suppression pool scrubbing phenomenon for the aerosol species. Battelle performed a sensitivity study using the SPARC code for Peach Bottom on this issue, confirming the large uncertainty characterization associated with this issue. Modeling uncertainties within SPARC were not considered. Battelle analyzed the TC3 sequence, which included wetwell venting, such that both the RPV and CCI releases have the potential to be scrubbed. The resultant decontamination factors (DFs) ranged from slightly less than a factor of two up to essentially complete scrubbing (essentially infinite decontamination). Review of the results indicates no basis for eliminating either of the extremes. Even for a constant set of SPARC [2] input assumptions, the decontamination varied widely with time--the DF ranged from very large early in the accident to two for the same sequence at late times in the accident. Although the ultimate DFs are quite different for the in-vessel releases through the SRVs (DFVpa) versus the core-concrete interaction releases through the drywell vents (DFCpa), the factors governing uncertainty were assumed to be similar and both release types are treated within the same issue. The difference in the scrubbing for these two types of releases result from the different distribution of particle sizes, differing depths of water under which the release occurs and the manner in which gas bubbles are formed. The scrubbing of the core-concrete species only applies to accident progressions in which the containment remains intact following RPV breach, or in which the location of containment failure is in the airspace above the suppression pool.

The results of the sensitivity study discussed above were reported in early 1986. Subsequently (May, 1986) Battelle has reported revised results indicating lower DFVpa values and somewhat higher DFCpa values, though the DFVpa values are still large and are still substantially greater than the DFCpa values [2]. The reduction in DFVpa reflects the results of correcting a TRAP-MERGE error which had led to the calculation of excessively large particle sizes for aerosols escaping the RPV. The reason for the increase in the DFCpa values has not been definitely established but likely reflects the inclusion of continued flow from the control rod drive pumps to the melt in the newer sensitivity study; this effect was not included in the older study. The resulting steam generation could lead to a decontamination due to steam condensation that would not be sensitive to the parameters that were varied in the sensitivity study. The change in the DFCpa values was typically an increase by a factor of two or three, which is significant only for the cases in which DFCpa is otherwise small.

If the DF is large (e.g., > 10) it is expected that the exact value of the DF will not be very important in terms of the over-all risk profile generated by the LLH study. Hence, a level structure was defined that reflects the belief that DFVpa is likely larger than DFCpa, and preserves some independence in specifying the weights assigned to very low values for the two DFs, yet does not require treating them as separate issues.

The Peach Bottom STCP result for DFCpa is level 2, based on the calculated DF for tellurium in the TC3 sequence. Tellurium is used here since substantial quantities are released both in-vessel and during CCI. The other species had somewhat larger values of DF in the base case. Levels 1 and 4 of DFCpa are based on the Battelle sensitivity studies identified above, although the level 1 value simply represents a very large DF and it was generally agreed by the experts that the absolute value at this level is not really important. Level 5 was derived to allow treatment of both factors within the same issue and also to allow more freedom in selecting weighting factors. A reviewer considering low DFs to be plausible only for DFCpa can express that opinion through level 4, whereas low values for both DFs can be selected through level 5. The DF values associated with each level were applied uniformly to aerosols, independent of radionuclide group.

There is other evidence available besides the Battelle sensitivity study referenced above. In general, other models tend to assign higher scrubbing values than those predicted by SPARC. In addition, recent experimental evidence (EPRI tests, currently unpublished) also suggests very substantial decontamination factors. The DFs for discharge through a quencher-type geometry with a five foot depths were found to be in the 2000-5000 range for particles on the order of a micron, and 3 to 1800 for smaller particles (.3 micron). The key sensitivity is particle size, but it is clear from the evidence that residence time of the carrier gas in the pool, the fraction of the carrier gas that is condensable, and the velocity of the gas are also important.

51

The SPARC model also has a significant sensitivity to pool temperature, but the experimental data does not support this at this time.

A review of the sensitivities and recent data versus the SPARC model could conclude that the model underpredicts DFs by factors of 5 to 10. Two features of the model would lead to this conservatism: (1) the entrance effects are neglected (jetting and bubble formation) and (2) the bubble collapse phenomenon is not modeled. Nevertheless, the experimental data is still preliminary, and there remains a fairly large uncertainty in the specification of DFs for the suppression pool.

The weighting factors selected by each of the reviewers are listed in Table B-9. Overall there was a tendency toward high decontamination factors. The reviewers were nearly unanimous in their belief that the scrubbing of the in-vessel release would be very large, with most of the weight assigned to level 2. The reasons for individual reviewer's weighting factors on this issue are somewhat complicated by the two parts of the issue. For example, reviewer #6 stated that his numbers were primarily driven by the ex-vessel factor (DFCpa), level 2 being most representive of experimental evidence which has shown DFs of 20 for ex-vessel sources. He also believed that the lowest values of decontamination illustrated in levels 4 and 5 would be unlikely because that would require all particles to be very small, whereas a distribution of sizes would always be predicted. This reviewer also felt that the decontamination value of 5000 was too big because the competing effect of re-entrainment would be predicted to result in release on the order of 1.0×10^{-4}.

An observer at the meeting pointed out that the American Physical Society (APS) had specific suggestions after their review of this issue. The suggested approach was that the DF should be the minimum of DF versus particle size for the curve calculated for all other conditions the same as in the problem of concern. This arose from their very large uncertainty in the particle size distributions as predicted by available models, and this approach would ensure coverage. Their particular concern is with the particle growth models that tend to predict large particles relative to scrubbing effectiveness The SARRP review team expressed considerable disagreement with the APS view and in general found it to be a bounding approach that conceals the actual state of knowledge concerning suppression pool effectiveness. All experimental evidence also points to the high effectiveness of suppression pool scrubbing.

Table B-9

WEIGHTING FACTORS FOR SUPPRESSION POOL SCRUBBING OF AEROSOLS

Level			Weighting Factor						
			Reviewer						
	DFVpa	DFCpa	1	2	3	4	5	6	Composite
1.	5000	100	0.1	0.2	0.1	0.1	0.05	0.05	0.1
2.	200	22	0.8	0.6	0.1	0.6	0.3	0.65	0.5
3.	40	5	0.1	0.1	0.1	0.2	0.5	0.2	0.2
4.	10	1.8	0.0	0.1	0.5	0.1	0.15	0.1	0.16
5.	1.8	1.8	0.0	0.0	0.2	0.0	0.0	0.0	0.03

B.1.5 Suppression Pool Scrubbing of Volatile Iodine Species

This issue is similar to the previous issue, but is concerned with the scrubbing of volatile iodine species rather than aerosols. This issue is of importance only if the CsI undergoes transformation in-vessel to more volatile forms (Section B.1.2). It should also be noted that this scrubbing only applies to the early sources of iodine and does not include consideration of the late releases of iodine that are treated within the last source-term issue (Section B.1.9). If some part of the CsI inventory is converted to elemental iodine, the conditions may not favor high DFs for the following reasons: (1) the pool is likely to be at or near saturation; (2) there are no additives to enhance iodine retention; (3) continued sparging of the pool due to releases of hot gases and steam from the RPV could re-release absorbed iodine; and (4) boiling due to decay heat could also re-release some iodine. These same factors would be considerably less important if the volatile species were HI, unless the iodine becomes oxidized in the pool to iodine, converted to organic form, or otherwise rendered volatile in aqueous solution. Radiolysis effects enhance the possibility of such conversions. (Re-release of these forms from the pool are treated in the issue described in Section B.1.9.) In either case, the rate of iodine absorption could be limited by diffusion rates in the bubbles. Diffusion is generally sufficiently rapid so that it is not expected to limit absorption of iodine vapors, but exceptions could arise given unfavorable combinations of the relevant parameters (e.g., large bubble sizes, shallow vent depths, and high containment pressures.) There is also uncertainty associated with the boundary conditions in containment, such as containment pressure, which can have significant impact on the scrubbing of the volatile iodine species.

Except for the potential diffusion limitation discussed above, which is unlikely to be very important, it is not clear that scrubbing parameters are more favorable for vessel releases

(DFVpv) than for core concrete interaction releases (DFCpv), in contrast to the situation for aerosol scrubbing. Separate values were not defined for these parameters because there is no modeling of mechanisms which may release volatile iodine during CCI.

Releases of vapor iodine species are not treated in the STCP, and a detailed assessment of this issue was not within the scope of this program. The SARRP analysts offered a range of decontamination factors to essentially cover the cases of no scrubbing up to very effective scrubbing. The only evidence available relative to this issue at the time that weighting factors were assigned was a set of preliminary calculations performed by Battelle Northwest that indicated very effective scrubbing. These results were incomplete; for example, the sensitivity to pH of the water was not fully investigated. The SARRP values for the decontamination factors for each level are listed in Table B-10, along with the weighting factors provided by the reviewers.

Table B-10

SUPPRESSION POOL SCRUBBING OF VOLATILE IODINE SPECIES

Level		Weighting Factor						
		Reviewer						
DFVpv and DFCpv		1	2	3	4	5	6	Composite
1.	500	0.1	0.125	0.0	0.0	0.0	0.0	0.03
2.	50	0.3	0.25	0.2	0.3	0.2	0.1	0.23
3.	10	0.4	0.25	0.3	0.3	0.4	0.2	0.31
4.	3	0.2	0.25	0.4	0.3	0.3	0.5	0.33
5.	1	0.0	0.125	0.1	0.1	0.1	0.2	0.10

The reviewers cited a lack of evidence as the reason for the weighting factors assigned, however, all believed that significant scrubbing was very likely. Several reviewers also believed that there was little difference between the first two levels, since the scrubbing would be very effective in either case.

There was some discussion on the role that bubbles, particularly large bubbles, would play in this iodine scrubbing phenomenon. The models of effects in bubbles must also consider the dynamic action of the bubbles, continuously breaking up and reforming. The overall impact of the bubble phenomenology is difficult to predict given current modeling and data limitations. The weighting factors illustrate this uncertainty as well as all the others described above--the three levels other than the two bounds are weighted fairly equally.

B.1.6 Revolatilization Following Vessel Breach

This issue, which is analogous to the similar issue for Surry and the other plants [5,6], refers to the phenomena that could result in releases of volatile species from the RPV that are not modeled in the STCP. If substantial amounts of these species are retained in the RPV, decay heating could eventually result in their revolatilization and perhaps addition to the source term in containment. This issue has two components. The first is whether or not temperatures in the RPV reach levels which are high enough to revolatilize the fission-product elements (the deposited chemical forms may have low vapor pressures for these elements). The second is whether there is sufficient flow from the RPV to the containment to sweep out the revolatilized fission products. For the BWR, particularly with the Mark I containment, high drywell temperatures are predicted for late times in some accident sequences, and this heating could promote substantial revolatilization. This issue has the potential to be quite risk-significant, particularly if the inventory of Cs, I and Te predicted to be retained up until vessel breach is large, because the revolatilized inventory released later may not undergo scrubbing in the suppression pool. This phenomena governs the source terms for Peach Bottom predicted by the IDCOR MAAP code. The phenomenology of this revolatilization, including both the degree and the timing, is very uncertain. The STCP does not treat this phenomenon. The IDCOR results for Peach Bottom derived with the MAAP code predict very high levels of revolatilization (on the order of 90%). The MAAP results are driven by its prediction of very high drywell temperatures. Tellurium, Cs and I could all be subject to revolatilization, but for this issue only the Cs and I are considered, and these are considered as one issue with the same levels. There is some dependence on accident progression (which impacts drywell temperature) that is also not fully modeled.

There are other uncertainties associated with this phenomenon than just temperature effects. The chemistry of the initial deposits in the primary are very uncertain, for example MAAP predicts vapor condensation and very high levels of initial retention whereas TRAP-MELT predicts aerosol deposition due to sedimentation and diffusiophoresis.

Levels were derived for this issue to span the uncertainty, from no revolatilization to the very high levels predicted by the MAAP code. The levels, defined in terms of the fraction of the material deposited which is subsequently released to the containment, are listed in Table B-11 along with the display of reviewers' weighting factors. The weighting factors point to intermediate levels of revolatilization, levels 2 and 3, with the upper level weighted somewhat less. The extremes, levels 1 and 4, were weighted significantly less.

55

Table B-11

REVOLATILIZATION FROM THE RPV FOLLOWING VESSEL BREACH

Level	Fraction Released to Containment	Weighting Factor Reviewer						
		1	2	3	4	5	6	Composite
1.	0.0	0.0	0.1	0.05	0.0	0.05	0.0	0.03
2.	0.15	0.2	0.4	0.4	0.3	0.35	0.2	0.31
3.	0.5	0.7	0.4	0.35	0.5	0.4	0.7	0.51
4.	0.9	0.1	0.1	0.2	0.2	0.2	0.1	0.15

One rationale proposed for limited revolatilization was that revaporization would very likely occur, but it would be limited since the deposits in the RPV would be mixtures of many compounds, particularly complicated by chemical reactions with the boron. Thus, as the revolatilization started, the concentration of Cs, for example, would decrease in the deposits, leading to a lower activity that would eventually limit the revolatilization chemically. The exact amount of revolatilization would remain in question, but several of the reviewers indicated that the 50% level would seem reasonable given lack of any additional evidence. Another reviewer pointed out that the MAAP calculations did not include these chemistry effects but they did predict that even though revolatilization did occur, the species would tend to redeposit on cooler surfaces. Reviewer #2 also pointed out that there is considerable uncertainty concerning the release of the species from the RPV since the gas exchange from the unique geometry associated with the vessel breached at its lowest point is very difficult to predict. However, a late containment failure would drive the revolatilized material that was in the vapor state out at the time of failure. Finally, another reviewer stated that there were more recent calculations by IDCOR with improvements in the natural circulation model; these more recent results indicate revolatilization factors of 60-70%. In summary at the meeting, the review group reiterated that the whole issue remains very uncertain.

B.1.7 Release from the Melt During Core-Concrete Interactions

There are significant uncertainties in the predictions for source terms associated with core-concrete interactions (CCI). Some insights into the range of uncertainty associated with this issue have been obtained from review of calculated releases as predicted by a number of different studies.

There are significant uncertainties in CORCON-VANESA release predictions that make this issue a high priority for the LLH study. In addition, high CCI releases contribute significantly to the central estimate of risk for Peach Bottom. Some insights into the range of uncertainty associated with this issue can be obtained from review of calculated releases as predicted by a number of different studies. These results are reproduced in Table B-12 for a number of studies of different plants, in the format of FCCI/(1-FCOR), i.e., the release fraction during CCI (FCCI) normalized to the amount of the species remaining in the melt at the time of vessel failure (1 - FCOR). Output from five sources is included:

1. The range of values from central estimate calculations with the STCP of Peach Bottom for four sequences (TC1,TC2/TC3, TB1/TB2, and V) [7]. The variation therefore includes the variation in input conditions associated with the different sequences.
2. The range of results from a Peach Bottom sensitivity analysis performed by Battelle using the STCP [2]. One sequence was analyzed--TB.
3. The range of values resulting from a Sandia sensitivity study of the AE sequence for Peach Bottom, including some input variations not studied in item 2 [8].
4. The range of values obtained in Surry sensitivity studies performed at Sandia [5].
5. The range of values reported in the *Reactor Safety Study* [9].

Table B-12

RANGES OF CALCULATED RESULTS FOR CCI RELEASES

Species			$\frac{\text{FCCI}}{1 - \text{FCOR}}$		
	1. STCP Central Est.	2. STCP Sen. Study	3. Sandia Sen. Study	4. Sandia Surry Sen.	5. RSS* Range
Xe, Kr, Cs, I	1.0	1.0	1.0	1.0	1.0
Te	0.56-0.68	0.48-0.65	0.52-0.93	0.07-0.29	1.0
Sr	0.65-0.84	0.73-0.84	0.10-0.95	0.086-0.40	0.002-0.05
Ru	$<10^{-5}$	$<10^{-5}$	Not reported	Not reported	0.002-0.05
La	0.017-0.07	0.015-0.06	0.006-0.05	0.0005-0.01	0.002-0.05
Ce	0.034-0.09	0.028-0.09	0.006-0.12	0.001-0.023	0.002-0.05
Ba	0.45-0.62	0.54-0.61	0.054-0.80	0.06-0.24	0.002-0.05

*RSS ranges given as a factor of five in either direction from the RSS "central" values

The results in the table indicate that the CORCON-VANESA calculations for Peach Bottom have very high releases with fairly narrow ranges for Te, Sr and Ce. The same studies also predict smaller, but significant, releases of La and Ce with moderate ranges across sequence differences and code input sensitivities. The Sandia sensitivity studies reported in column 3 had results that were very similar to the Battelle calculations, with the exception of a case that affects the low range involving a very low value of unoxidized Zr in the core--10%.

Another information source which argues for large uncertainty in this issue is IDCOR. While IDCOR efforts at modeling CCI releases are not complete, the IDCOR Technical Support for Issue Resolution Document [10] states that their model may estimate much lower releases than CORCON-VANESA. For example, an Sr release of 0.04% is listed, which is well below any of the calculations presented in Table B-12. The reasons cited for the lower releases involve the formation of stable metasilicates of Sr, Ba, La and Ce which are included in IDCOR modeling but not in the STCP. Though the point may be valid in principle, melts derived from concrete of the Peach Bottom composition will have a large excess of basic oxides (notably CaO) over the available acidic oxides (principally (SiO_2); it is unclear whether silicate formation could have a significant impact in this environment because the fission product oxides must compete with the large excess of CaO for the available SiO_2. In any case, the modeling of this silicate formation has not yet been reviewed by experts outside of IDCOR.

If the LLH study were to be limited to the CORCON-VANESA results obtained specifically for Peach Bottom in the Battelle calculations, the study would imply this issue is not very important to risk uncertainty because of the very limited range in release fractions for the dominant species. It is believed that such a result would be very misleading. There are substantial modeling uncertainties in CORCON which were not explored in any of these studies, and no modeling uncertainties in VANESA were considered at all. In an indirect fashion, the large difference between Surry and the Peach Bottom results suggests that there are features of the model whose sensitivity has not been tested in the comparisons among the Peach Bottom analyses, with the partial exception of the low-Zr case in the Sandia Peach Bottom study. It is important to note that the key features driving the differences between the Peach Bottom and the Surry results involve regimes of parameter space not yet studied in the VANESA experimental validation program. The IDCOR results also suggest the need for considering a wider range of release fractions, although the CORCON-VANESA model is believed to be the more sophisticated (and better validated) of the two treatments. The strawman proposal to the SARRP Peach Bottom LLH review group suggested that four levels be defined for the CCI release fractions, with the range spanned by the Peach Bottom CORCON-VANESA results being used to define levels 2 and 4. For level 3, the lower end of the Peach Bottom TB sensitivity study calculation was used. The IDCOR model was suggested as a source for defining the lowest level; however, suitable results could not be obtained upon the required time schedule. As an alternative, a level was defined which is based in part upon Surry calculations and in part upon considerations raised in the Surry LLH meeting. It included allowance for the hypothesis offered at the Surry meeting, that crust formation might inhibit the release of even the most volatile species [5].

None of the calculations cited above indicated significant release of Group 6 (Ru, Mo, etc). In order to allow for the possibility that the chemistry may be incomplete with respect to these species, the WASH-1400 upper limit was specified for level 4.

It was not recommended that any level substantially higher than the highest CORCON-VANESA result be specified. One reason is that releases can not be increased very much for three of the most important species (Te, Sr, Ba). Another is that examination of the details of the TB base case calculations (which gave some of the highest releases) shows that rather special circumstances combined to give the high release fractions obtained; thus, it is plausible that this model will not give substantially higher release fractions for any reasonable parameter combinations. (Of course, modeling uncertainty in CORCON-VANESA could include upward uncertainties as well as downward.) Finally, experience has shown that the CORCON-VANESA release fractions are already high enough to generate considerable consternation within the reactor safety community; it is not clear that much would be gained by exploring the implications of still higher release fractions without some technical justification for doing so. This original level scheme was not accepted by the review group without some modification. First, the notion that release fractions for volatiles might possibly be small, as had been accepted for Surry, was rejected on the grounds that the strong heat source provided by the oxidation of the large amounts of Zr present made it much less likely that crust formation could inhibit releases of volatile species. On the other hand, the review group also expressed the belief that the very high releases of [illegible] and Ba, as in the upper limit of the Sandia sensitivity studies, were unrealistic, and these values were reduced slightly. The level structure that was adopted is provided in Table B-13.

The weighting factors assigned to the different levels are listed in Table B-14. With one exception, the two central levels (2 and 3) were weighted with approximately 80% of the total: reviewer #1 weighted the lower values of levels 1 and 2 more heavily. One reason level 1 was weighted less was the belief that while crusting phenomenon (described in conjunction with the Surry weighting factors for this issue [5] could still occur at Peach Bottom, the effect would be considerably smaller than for Surry.

Table B-13
VALUES OF FCCI/(1.0-FCOR) FOR THE THE STUDY OF CCI RELEASE UNCERTAINTIES

Species	FCCI/(1.0-FCOR)			
	Level 1	Level 2	Level 3	Level 4
Xe, Kr, Cs, I	1.0	1.0	1.0	1.0
Te	0.1	0.5	0.5	0.93
Sr	0.01	0.1	0.73	0.73
Ru	$<10^{-5}$	$<10^{-5}$	$<10^{-5}$	0.05
La	1.0×10^{-4}	0.006	0.015	0.065
Ce	1.0×10^{-4}	0.006	0.028	0.12
Ba	0.01	0.054	0.54	0.54

Table B-14
WEIGHTING FACTORS FOR CORE/CONCRETE INTERACTION RELEASES

Level	Weighting Factor Reviewer						
	1	2	3	4	5	6	Composite
1.	0.3	0.1	0.05	0.05	0.1	0.1	0.12
2.	0.4	0.4	0.4	0.45	0.4	0.4	0.41
3.	0.15	0.4	0.4	0.45	0.4	0.4	0.37
4.	0.15	0.1	0.15	0.05	0.1	0.1	0.10

B.1.8 Reactor Building and Refueling Bay Decontamination Factors

Releases from the drywell and wetwell are also subject to holdup and retention within the reactor building. The effective decontamination factors associated with this phenomenon (DFsc) were selected as an issue for the LLH study due to the direct impact on risk. The calculated results (STCP) for Peach Bottom include this effect for nearly all releases, and while the decontamination is not particularly large (DF = 1.5 - 2.5) it does play a role in the outcome. More specifically, the results for three species for six sequences are listed below:

Sequence	Decontamination Factor		
	Iodine	Tellurium	Strontium
TC1	2.0	1.2	1.3
TC2	2.7	2.1	2.1
TC3	1.9	1.7	1.7
TB1	1.1	1.5	1.4
TB2	2.9	1.5	1.7
V	1.8	1.5	1.8

60

The results listed above are useful for consideration of other species. Iodine is representative of release from the RCS in the V sequence and of releases at the start of CCI for all other sequences. The calculated DFsc for Cs is identical to the iodine. The Te and Sr species are representative of releases that occur later during CCI, although only Te is released at very late times. The values of DFsc for these two species are similar and vary similarly among sequences. The values for all three species do not show large variation among sequences, except perhaps for the release for the TB1 sequence which indicated lower decontamination, perhaps due to a puff-type release at the time of drywell failure. Other trends are not readily apparent and are well within the uncertainties of this issue.

It is believed that the biggest determinant of the results is the role of recurrent hydrogen and carbon monoxide burns in the secondary containment. Each burn tends to expel airborne radionuclides, and the randomness associated with the burns probably accounts for the seemingly random variation in the results listed previously. The results above indicate the sensitivity of the calculated DFs to sequence variation but they do not account for uncertainties, including: (1) presence and timing of burns in the secondary containment, (2) the role of the refueling bay (which is assumed to be eliminated by burns in the Battelle calculations), and (3) the uncertainties in aerosol agglomeration and deposition.

The QUEST program [3] did address the third item listed above, although the results were for Surry and the numerical values are not applicable to Peach Bottom. The insights are applicable however, and it was concluded in QUEST that the aerosol phenomenology contributes to uncertainty in the downward direction (suggesting smaller source terms) but very little to upward uncertainty.

Another source of information on this issue is IDCOR. The Peach Bottom Integrated Containment Analysis Document [11] can be used to derive values of effective DFsc for CsI for several sequences. IDCOR 85.2 [12] also presents CsI values for DFsc for a more recent study of the TQUV sequence. These results are listed below:

Sequence	IDCOR 23.1	IDCOR 85.2
TW	7.1	--
TC	16	--
S1E	43	--
TQUV	19	7.7

It is obvious that there is a great difference between the STCP methodology and the IDCOR methodology. The retention factors calculated in IDCOR are critical to risk because they are the sole reason that the large releases from containment which occur due to

61

revolatilization of material initially deposited within the RPV do not result in high risk--these releases are reduced by more than an order of magnitude due to secondary containment retention. Phenomena that generate large DFsc values in IDCOR include: enhanced deposition due to large recirculation flows in the secondary containment, longer residence times due to containment failure by leakage rather than more catastrophic modes, the smaller hydrogen generation sources modeled in IDCOR (apparently resulting in the preclusion of burns in the reactor building), and the methodology differences between IDCOR and the STCP in modeling aerosols.

The levels for the the LLH study reflect this difference between the STCP results and the IDCOR results. The first level is representative of the IDCOR results. Levels 3 and 4 represent the range of STCP results (specifically for the Sr releases). Level 2 was selected to divide the range between IDCOR and STCP results. Because of the large variations between these different calculations, sequence-to-sequence variation was not included and the same levels were proposed for all sequences.

The review group had difficulty applying one set of levels to all circumstances, and this issue was subsequently divided into two parts, one dealing with the releases to the reactor building and the other dealing with releases direct to the refueling bay (the latter associated with failure of the drywell head seal, see Appendix A). Two competing factors are considered in the assignment of levels for the refueling bay DF. First, the refueling bay is a large volume which is largely empty. The surface area per unit volume which is available for deposition is small compared to the rest of the reactor building. In addition, the sides of the refueling bay contain large blowout panels. It is therefore thought that residence times in the refueling bay for aerosols would be short. One of the reviewers noted that wind, outside the plant, would have a purging effect on the volume once the blowout panels were gone (blown out). The second consideration was that large leakage rates from the drywell head seal were assumed always to be at a level that would retain the primary containment pressure (i. e., a leak rather than a rupture). Low rates of leakage from the primary containment would tend to enhance aerosol residence times and therefore deposition. It is noted, however, that the effect of primary containment leak rate is not reflected in the DF values assigned to the reactor building (as distinct from the refueling bay) pathway. The DFsc values for release to the reactor building are listed in Table B-15, while the releases directly to the refueling bay were weighted considering the lower DF values indicated in Table B-16.

At the review meeting, recent calculations of reactor building phenomenology performed for the Browns Ferry plant were discussed in detail since the phenomenology, particular of hydrogen burning, could greatly influence the effective decontamination factors (these results were not available when the levels were developed). The results were based on CONTAIN calculations, verified and supported by HECTR calculations. The results tended to indicate significant differences in the pressure loadings from the Battelle calculations using MARCH, with a conclusion that building failure would be unlikely. Carbon dioxide was used as a tracer to determine the mean residence time of gases, and there was considerable retention of the gas, on the order of 70-80% retention for calculations out to two hours. This result was the same for a nine compartment model as for a simplified, one compartment model. Several of the reviewers expressed uncertainty in the results since carbon monoxide was not modeled as a source of burning and simply as another gas volume leading to higher flows out of the building. The analyst presenting the results felt that the CO addition would not dramatically change the conclusions since the pressure increments would not change greatly in magnitude although there might be more burns which would decrease the retention. Other reviewers indicated that they would expect more than pressure-driven release--after the blowout panels were removed, circulation, wind and diffusion would contribute to transfer out of the building. It was re-emphasized that the results were for Browns Ferry, were of limited time duration, and only accounted for CO_2 as a tracer which would be roughly equivalent to the noble gas.

The Battelle calculations give no credit for retention in the refueling bay Although calculated residence times of three hours had been obtained, the analysts were not comfortable with any significant retention in the refueling bay. Characteristic aerosol deposition times in the reactor building late in the accident sequence have been calculated to be about four hours. The Battelle analysts believe that these residence times are longer than reality for a number of reasons: (1) underestimation of surface area, (2) compartmentalization is not fully addressed and (3) short flow pathways, bypassing larger rooms, for fission products directly to the refueling bay have not been fully studied. The Battelle results also show residence times of two hours late in the accident, during the period of core-concrete interaction. The combination of predicted residence time and predicted deposition time would therefore point to DFs of about 2. The uncertainty in the surface area and the other uncertainties tend to point to conservatism (underestimation) in this result, perhaps up to a factor of two or three. One final point concerning the results is that the calculated DFs are probably quite conservative for very late releases due to revolatilization. The conditions modeled in the code do not apply to these later time frames.

All of these discussions lead to the assignment of weighting factors illustrated in Table B-15. As indicated, there was fairly good agreement that the two ends of the range should have 10-20% weighting factors. Although the individual's inputs varied somewhat, the two middle ranges, levels 2 and 3, were each weighted about equally on the average. The variation was essentially due to the different importances assigned by the individual reviewers to the uncertainty factors outlined above.

Table B-15
DECONTAMINATION ASSOCIATED WITH DEPOSITION IN THE REACTOR BUILDING

Level	DF	Weighting Factors Reviewer 1	2	3	4	5	6	Composite
1.	15	.1	.2	.2	.1	.3	.1	0.17
2.	5	.7	.5	.3	.3	.3	.2	0.38
3.	2.1	.2	.2	.4	.4	.3	.6	0.35
4.	1.4	0.0	.1	.1	.2	.1	.1	0.10

Releases directly to the refueling bay would be expected to have substantially different effective decontamination factors and the code work does not really apply. New values for the possible decontamination factors were selected to span the relatively narrow range of values believed reasonable by the review group. The levels and results are indicated in Table B-16. The weighting factors selected by the individual reviewers indicated considerable differences on this issue, although the range of decontamination factors with significant weight is small: decontamination factors from a value of 1.0 to a factor of 5.0. The weighting factors in this case are based on expert opinion rather than any specific research on the phenomenon. It should be noted that the factors listed are for releases that reach the refueling bay. It was emphasized that the containment failure issue should establish the amount of material that actually is released to the refueling bay, since some of the drywell upper head failures might not be expected to be clear paths to the refueling bay.

Table B-16
DFs FOR RELEASES THAT GO DIRECTLY TO THE REFUELING BAY

Level	DF	Weighting Factors Reviewer 1	2	3	4	5	6	Composite
1.	5	.2	0.0	0.0	0.0	.2	.1	0.08
2.	3	.4	.1	.2	.05	.3	.2	0.18
3.	1.5	.4	.5	.6	.15	.3	.3	0.38
4.	1	0.0	.4	.2	.8	.2	.4	0.36

62

BEST COPY AVAILABLE

B.1.9 Late Releases of Iodine

This issue accounts for potential sources of iodine at relatively late times in the accident. Revolatilization from the suppression pool was the primary consideration for this issue. Because the reviewers believed that mechanisms for this late release would produce volatile forms of iodine (I_2, HI) no decontamination by the pool or deposition within the containment structure was assumed to occur. It should be noted that this simplified representation of late sources does not address the full scope of this issue, particularly late sources of other species.

Revolatilization (or resuspension) of iodine from the suppression pool is postulated to result from three possible causes: (1) pool flashing at containment failure, (2) pool boiling as a result of decay heating, and (3) changes in the chemical form of fission products in the suppression pool (e.g., due to radiolysis). Most of the discussion centered on the third cause.

The weighting factors for each level of release are listed in Table B-17. As shown, it was a majority opinion that some of these mechanisms would result in late sources, although the fairly large release fraction of level 4 received only a 10-20% weight.

Table B-17
LEVELS AND WEIGHTING FACTORS FOR LATE SOURCES OF IODINE

Level	Release Fraction	Weighting Factor Reviewer 1	2	3	4	5	6	Composite
1.	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.07
2.	0.05	0.3	0.4	0.3	0.3	0.4	0.2	0.32
3.	0.15	0.4	0.5	0.5	0.5	0.45	0.6	0.47
4.	0.5	0.0	0.1	0.2	0.2	0.15	0.2	0.14

B.1.10 Other Issues

There was some discussion of other issues that might be appropriate for inclusion in the uncertainty study. For example there was some discussion of the additional releases associated with high-pressure melt ejection from the RPV at vessel breach, as well as enhanced release during direct containment heating. The review group decided that conditions for direct heating were sufficiently less favorable in BWRs that a treatment analogous to the PWR treatment of this issue was inappropriate. Reasons for this judgment included the likelihood of primary system depressurization, presence of the suppression pool and the small drywell volume with limited oxygen supply. As a compromise, it was decided to treat the high-pressure ejection component as was done in the PWRs, but omit the direct-heating component of the PWR treatment.

The level structure and composite weights adopted for the high-pressure ejection releases are repeated below in Table B-18. The release fractions given are to be applied only to that fraction of the corium inventory which is ejected coherently at vessel breach. Once again, there was not time to include this as an uncertainty issue in the LLH study of Peach Bottom.

Table B-18

VALUES OF RELEASE FRACTIONS FOR HIGH PRESSURE EJECTION

Species	Release Fractions			
(RSS Groups)	Level 1	Level 2	Level 3	Level 4
1	1.0	1.0	1.0	1.0
2-3	0.1	0.5	1.0	1.0
4	0.01	0.1	0.1	1.0
5	1.0×10^{-4}	0.01	0.01	0.1
6	1.0×10^{-4}	1.0×10^{-3}	0.01	0.1
7	1.0×10^{-4}	1.0×10^{-3}	0.01	0.1
	Surry Composite Weighting Factors			
	0.07	0.32	0.58	0.03

Aerosol agglomeration and deposition uncertainties, based upon QUEST results, were considered as a possible issue in Surry [5]. In the present case, no analogous calculations are available; however, these uncertainties may be considered to be represented indirectly through the range of DFsc values considered for secondary containment retention.

It has also been suggested that drywell sprays could be activated in some scenarios. No STCP calculations are available but, if other experience with spray calculations is applicable, the DFs would likely be large enough so that the risk-significant questions would involve the timing and probability of spray availability rather than exact DF values.

As in all the SARRP LLH uncertainty studies, potential mechanisms for the resuspension of deposited radionuclides continue to be neglected, except for the case of iodine. There is, however, little technical basis for this neglect. No consideration has been given to the effect of radioactive decay chains (notably the Te-132 -- I-132 chain identified as potentially significant in QUEST). It is possible that the relative impact of this effect would be smaller in Peach Bottom than in some other plants, however.

B.2 METHODOLOGY FOR SOURCE-TERM ESTIMATION

The method used to calculate source terms was summarized in Section 2 of the main report. Additional detail concerning the calculation of source terms is provided in this section.

B.2.1 Interface Between Containment and Source-Term Analyses

The goal of the source-term analysis was the estimation, for each unique combination of core and containment conditions following core melt, of the amount of each radioactive species that would be released to the environment and would therefore be of concern for public health risk. Due to the large number of outcomes realized in the containment analysis, a method was needed to make the calculation tractable. This involved the grouping of results and inputs to reduce the number of actual calculations required to make reasonable source-term estimates for the full spectrum of accidents.

Accident Progression Bins

The first step in the assessment of radiological source terms was the determination of the attributes of the accident progression which had the largest impact on the source term. The different combinations of these attributes obtained as outcomes in the containment event tree analysis constitute categories, called accident-progression bins, that lump significantly different combinations of core and containment end states into categories that could be assessed together in terms of the source term. The bins determined by this process reflect current understanding of what is important to the source term. The attributes for binning the accident progressions account for variations including:

- Whether and when particular events (such as containment failure or vessel breach) occur;
- The character of events that do occur, such as the location of containment failure or the degree of suppression pool bypass;
- Flows and pathways of gas, water and aerosols during particular phases of the accident;
- Pressure and temperatures in the vessel and containment; and
- The operation of systems which may reduce or increase source terms.

Continuously varying parameters such as timing and pressure are discretized as appropriate.

The binning scheme for Peach Bottom is more detailed than the scheme used for the other SARRP reference plants. This detail was retained to minimize the prejudging of the importance of the various attributes, and in particular combinations of attributes, instead allowing the source-term analysis to directly determine the effect of the combinations of attributes on the source term. The more detailed evaluation was made possible by the RELTRAC code [13] which allowed calculations to be performed to a level of detail which is at least as great as included in the binning attributes.

The features of the accident progression which are specified as attributes of the accident-progression bin are dictated by the input requirements of RELTRAC. The specific features considered are discussed in Table B-19. The bin definitions are provided explicitly in Table B-20. As illustrated in the table, the bins are designated by a 22-letter code corresponding to the 22 bin attributes.

From the listing of bin attributes, it can be seen that the accident-progression bins group the accident pathways both by containment response and timing of that response. There is some redundancy among the binning parameters (i.e., they are not all independent), but this redundancy is required to provide the inputs required by RELTRAC. Within the automated framework which was implemented for this analysis (described in Section 2 of the main report), it was desired to reduce the amount of manual intervention in the process to a minimum. Thus each computer code was designed to take input (or at least that portion of the input which varied over the course of the analysis) directly from the computer code which immediately precedes it in the flow of information (see Figure 2-2 in the main report). All the information RELTRAC needs to perform a source-term estimate is transmitted through the 22-letter code which designates an accident-progression bin. It was not known a priori, although the analysts could speculate, what the impact of various combinations of accident-progression characteristics would be on the source-term estimate. This is even more true considering the combinations of source-term issue levels that were sampled in the LLH process. Therefore the courser groupings of outcomes considered in the containment event tree analysis were not used directly in the source-term analysis. Each bin (combination of the features listed above) provides RELTRAC a unique set of inputs. However, depending on the levels of the source-term issues which correspond to a particular LLH sample member, the results calculated by RELTRAC for two different bins may be similar.

While the 22-dimension bins served well in the transition from the containment analysis to the source-term analysis, they do result in rather unwieldy designators. The portions of the results that include accident-progression bins are listed in terms of 22-dimension bins. In the main report however, it was found that a reduced set of bins could convey similar information more efficiently, and a 10-dimension bin designator system was developed. These 10-dimension bins are defined in Table B-21. For convenience, Table B-22 lists a cross reference

68

Table B-19

ACCIDENT-PROGRESSION BIN PARAMETERS AND THEIR IMPACT IN RELTRAC

Accident Progression Feature	RELTRAC Parameters Impacted
1. The plant damage state which initiates the accident progression	Designates whether or not suppression pool boils following containment failure. Specifies which set of base case parameters values is used (derived from the STCP results).
2. Whether the decay heat generation on the core is high or low at the onset of fuel damage and whether or not there is injection to the RPV from the control rod drive (CRD) hydraulic system	Designates values to use for in-vessel fission product release rates. (Base case values from STCP results.)
3. Whether or not the RPV was breached, and if it was breached, whether injection was recovered beforehand	Determines whether or not the puff release of fission products associated with vessel breach occurs. Puff release is directed to the suppression pool (as opposed to the drywell) if injection has been restored.
4. The RPV pressure at vessel breach	Determines the magnitude of the puff release of fission products at RPV breach.
5. The time at which water was supplied to core debris on the drywell floor	Determines timing of DF applied to CCI releases to account for overlying water.
6. Whether or not core-concrete interaction occurs and if it occurs, when, or if, it is quenched	Determines length of time CCI releases occur.
7. The timing and location of containment leakage (leakage assumed not to depressurize containment)	Determines time to activate model for leakage from containment. Suppression pool DF applied to wetwell location.
8. The timing of wetwell rupture (7 ft^2 opening assumed) or venting	Determines time to depressurize containment if drywell rupture (see following characteristic) is not earlier. Suppression pool DF applied to flow from containment.
9. The timing of drywell rupture (7 ft^2 opening assumed)	Determined time to depressurize containment if wetwell rupture (see following characteristic) is not earlier. Prevents application of suppression pool DF to subsequent leakage.
10. The time at which drywell spray begins	Determines time to apply spray DF to material suspended in drywell.
11. Whether or not drywell spray continues following containment leakage or failure	Determines time to prevent application of spray DF to material suspended in the drywell
12. The flow pathway of fission products from the RPV prior to vessel breach	Activates model for stuck-open SRV vacuum breaker. Specifies split fraction for flow from RPV between drywell and suppression pool.

Table B-19 (Continued)

ACCIDENT-PROGRESSION BIN PARAMETERS AND THEIR IMPACT IN RELTRAC

Accident Progression Feature	RELTRAC Parameters Impacted
13. The time at which the suppression pool is bypassed	Specifies when, if ever, suppression pool DF (for quenchers and/or vents) is set to unity (i.e., no scrubbing).
14. The level of reactor building bypass up until the time that core debris is deposited on the drywell floor	Determines value used for DF in secondary containment. The possibilities are reactor building value, refueling bay value, or unity.
15. The level of reactor building bypass following the time at which core debris is deposited on the drywell floor	Similar to preceding characteristic.
16. Whether or not the fire protection system sprays in the reactor building are activated (only relevant for safety calculations)	Determines if additional DF, accounting for spray action, is applied to releases to secondary option containment.
17. The containment pressure immediately prior to vessel breach	Determines flow rates from drywell to the pool during core damage. Also used in calculating time to late failure.
18. The pressure rise in the containment associated with vessel breach	Determines redistribution of fission products between control volumes occurring at vessel breach. Also used in calculating time for late containment failure.
19. Whether or not the reactor core was assumed to collapse into the RPV lower plenum prior to vessel breach (slump or flow of melt progression)	Determines whether or not fission products suspended in the RPV atmosphere are purged to the suppression pool prior to vessel breach.
20 Whether or not direct containment heating occurred	Activates model for direct containment heating.
21 The availability of the suppression pool to scrub fission products released at vessel breach	Determines whether the suppression pool is considered in the redistribution of fission products between control volumes at vessel breach.
22. Whether or not offsite power was recovered prior to the time that the major portion of the vaporization release associated with core-concrete reaction has occurred	Sets time for late wetwell rupture (see above). Late wetwell rupture with power recovery is attributed to venting.

of the 22-dimension bins to the 10-dimension bins for the 77 accident progression bins that were used in the central estimate.

Table B-20
DEFINITION OF THE ACCIDENT-PROGRESSION BINS

Bin Parameter		Designator	Outcome	Effect on Source Term
1	Accident Sequence	A	TC (ATWS), fast	Nominal STCP run for timing, temperatures and decay heat. Determines presence of steam flow from containment after failure, due to suppression pool boiling.
		B	TC, slow	
		C	TC, containment leak	
		D	TC, failure to inject after containment failure	
		E	TB(Station Blackout), fast	
		F	TB, slow	
2	Decay Heat Power During Core Melt	A	High decay heat with CRD flow	Duration of melt-down phase. Magnitude of releases in-vessel and during CCI.
		B	High decay heat, no CRD flow	
		C	Low decay heat (long-term accident)	
3	Injection Recovery	A	No recovery	Occurrence of vessel breach, ans size of in-vessel release
		B	Recovery followed by vessel breach	
		C	Recovery with no vessel breach	
4	Transition from High to Low RPV pressure	A	At or before melt	Timing of flow from the vessel and vessel breach dynamics
		B	At recovery of injection	
		C	At vessel breach	
5	Time for Sustained Water to the Debris	A	At vessel breach	Determines potential for and timing of scrubbing of CCI releases by water
		B	At time of late power recovery	
		C	None	
6	Time for End of CCI	A	At vessel breach (no CCI)	Determines whether or not CCI releases occur, and their timing
		B	At time of late power recovery	
		C	No termination of CCI	
7	Time and Location of Containment Leak (No Depressurization)	A	Early, wetwell	Timing and path for the release to environment
		B	Early, drywell	
		C	At vessel breach, wetwell	
		D	At vessel breach, drywell	
		E	Late, wetwell	
		F	Late, drywell	
		G	None	

Table B-20 (Continued)

DEFINITION OF THE ACCIDENT-PROGRESSION BINS

Bin	Parameter	Designator	Outcome	Effect on Source Term
8	Time of Wetwell Failure (Depressurization)	A	Before core degradation	Timing and path for the release to environment
		B	During melt, with no recovery	
		C	During melt, with recovery	
		D	At vessel breach	
		E	Late vent	
		F	Late pressurization	
		G	None	
9	Time of Drywell Failure (Depressurization)	A	Before core degradation	Timing and path for the release to environment
		B	During melt, with no recovery	
		C	During melt, with recovery	
		D	At vessel breach	
		E	Late	
		F	None	
10	Time for Drywell Spray Initiation	A	At or before melt	Scrubbing in the drywell
		B	At injection recovery	
		C	At time of late power recovery	
		D	None	
11	Time for Cessation of Drywell Sprays	A	At wetwell or drywell failure	Scrubbing in the drywell
		B	None	
12	RPV Discharge Pathway Before Vessel Breach	A	Large leak of SRV vacuum breaker	Discharge flow split between the wetwell and drywell
		B	Small leak of SRV vacuum breaker	
		C	Through SRV to wetwell (no leak)	
13	Suppression Pool Bypass	A	Early pool bypass	Amount and timing of pool bypass, with attendant reduction in scrubbing
		B	Late pool bypass	
		C	No pool bypass	
14	Early Reactor Building Bypass	A	Standby gas treatment system operating	Reactor building decontamination factor
		B	SGTS bypassed, blowout panels open	
		C	Path through refueling bay	
		D	Reactor building complete bypass	

Table B-20 (Continued)

DEFINITION OF THE ACCIDENT-PROGRESSION BINS

Bin Parameter	Designator	Outcome	Effect on Source Term
15 Late Reactor Building Bypass	A	Standby gas treatment system operating	Reactor building decontamination factor
	B	SGTS bypassed, blowout panels open	
	C	Path through refueling bay	
	D	Reactor building complete bypass	
16 Reactor Building Global Fire Sprays	A	Fire sprays operating	For use only in evaluating the global fire spray safety option
	B	No fire sprays	
17 Containment Pressure Before Vessel Breach	A	Greater than or equal to 130 psi	Flows associated with core damage. Timing of late containment failure.
	B	Greater than or equal to 110 psi	
	C	Greater than or equal to 90 psi	
	D	Greater than or equal to 70 psi	
	E	Greater than or equal to 50 psi	
	F	Greater than or equal to 40 psi	
	G	Greater than or equal to 30 psi	
	H	Less than 30 psi	
18 Containment Pressure Rise at Vessel Breach	A	Greater than or equal to 130 psi	Flows associated with vessel breach. Timing of late containment failure.
	B	Greater than or equal to 110 psi	
	C	Greater than or equal to 90 psi	
	D	Greater than or equal to 70 psi	
	E	Greater than or equal to 50 psi	
	F	Greater than or equal to 40 psi	
	G	Greater than or equal to 30 psi	
	H	Less than 30 psi	
19 Meltdown Mode	A	Flow-type melt	Phenomenology associated with in-vessel releases
	B	Slump-type melt	
20 Direct Heating	A	Direct heating	Release fractions from the fuel at vessel failure
	B	No direct heating	
21 Pool Bypass at Vessel Breach	A	Pool bypass at vessel breach	Scrubbing at vessel failure
	B	No pool bypass at vessel breach	

Table B-20 (Continued)

DEFINITION OF THE ACCIDENT-PROGRESSION BINS

Bin Parameter	Designator	Outcome	Effect on Source Term
22 Late Ac Power Recovery	A	Yes, power recovered	Timing for late venting
	B	No power recovery	

Example

EBACCCGGDDBCBABBFDABBB

TB (station blackout)accident with fast timing and high resultant decay heat power. There is no recovery of injection, and the vessel depressurizes only after vessel breach. There is no water available to cover the core when it leaves the vessel (injection failure and no recovery), and CCI releases and not terminated. The containment does not fail by a nondepressurizing failure mode, but rather the drywell ruptures and depressurizes at vessel breach. There are no drywell sprays. There is no stuck open vacuum breaker, so SRV releases all go to the pool. There is late suppression pool bypass (implicit in the drywell rupture for this particular bin). The releases to the reactor building do not involve bypass, and the standby gas treatment system operates, but the reactor building release is later through the blowout panels and the SGTS is bypassed. There are no global fire sprays (base case). The containment pressure prior to vessel breach is 40 psi, and the pressure rise at vessel breach is 70 psi. It is a flow-type melt, with no direct heating, no suppression pool bypass at vessel breach. Ac power is not recovered in this accident-progression bin.

Table B-21

DEFINITION OF THE 10-DIMENSION ACCIDENT-PROGRESSION BINS

Bin Parameter	Designator	Outcome	Effect on Source Term
1 Accident Sequence	A	TB, fast (station blackout)	Nominal STCP run for timing temperatures and decay heat
	B	TB, slow	
	C	TC, slow (ATWS)	
	D	TC, fast	
2 Vessel Breach	A	Yes	Progression of accident and magnitude of releases
	B	No	
3 Ac Power Recovery	A	No recovery	Potential for recovery, and impact on scrubbing, etc.
	B	Late recovery (after vessel breach)	
	C	Early recovery (before vessel breach)	
	D	No loss of ac power	
4 CCI Releases	A	Occur after vessel breach	Timing and scrubbing of CCI releases
	B	After vessel breach in wet cavity	
	C	Occur up to time of power recovery	
	D	No CCI releases	
5 Early Containment Failure Location	A	Drywell rupture to the environment	Timing and path for any early release to environment
	B	Drywell leak to the environment	
	C	Drywell rupture to the refueling bay	
	D	Drywell leak to the refueling bay	
	E	Drywell rupture to the reactor building	
	F	Drywell leak to the reactor building	
	G	Wetwell rupture to the environment	
	H	Wetwell leak to the environment	
	I	Wetwell rupture to the reactor building	
	J	Wetwell leak to the reactor building	
	K	No early containment failure	
6 Containment Failure at Vessel Breach	A	Yes, failure at vessel breach	Dynamics and timing of containment failure and release (puff versus no puff)
	B	No failure at vessel breach	

Table B-21 (Continued)
DEFINITION OF THE 10-DIMENSION ACCIDENT-PROGRESSION BINS

Bin Parameter	Designator	Outcome	Effect on Source Term
7 Late Containment Failure Location	A	Drywell rupture to the environment	Timing and path for any early release to environment
	B	Drywell leak to the environment	
	C	Drywell rupture to the refueling bay	
	D	Drywell leak to the refueling bay	
	E	Drywell rupture to the reactor building	
	F	Drywell leak to the reactor building	
	G	Wetwell rupture to the environment	
	H	Wetwell leak to the environment	
	I	Wetwell rupture to the reactor building	
	J	Wetwell leak to the reactor building	
	K	No early containment failure	
8 Drywell Spray Status	A	Operating throughout accident	Scrubbing in the drywell
	B	Operate only in late phase	
	C	Operate only in early phase	
	D	No drywell sprays	
9 Direct Heating	A	Direct heating	Releases from fuel at vessel failure
	B	No direct heating	
10 Suppression Pool Bypass	A	Early and late pool bypass	Amount and timing of pool bypass, with attendant reduction in scrubbing
	B	Late pool bypass	
	C	No pool bypass	

Table B-22

CROSS REFERENCE OF 10-DIMENSION BINS WITH 22-DIMENSION CENTRAL ESTIMATE BINS

10 Dimension Bins	22-Dimension Bins Included in New 10-Dimension Bin	
AAAAAAADBB	EBACCCGADDBCBDDBHDABBB	
AAAAEAADAB	EBACCCGGDDBCBADAFCBABB	
AAAAEAADBB	EBAACCGGDDBCBADAEHABBB	EBACCCGGDDBCBADAFDABBB
	EBACCCGGDDBCBADBFDABBB	
AAAAEAEDAB	EBACCCGADDBCBABBHCBABB	EBACCCGGDDBCBABAFCBABB
	EBACCCGGDDBCBABBFCBABB	
AAAAEAEDBA	EBACCCGGDDBBBABAFDABBB	EBACCCGGDDBBBABBFDABBB
AAAAEAEDBB	EBAACCGADDBCBABBHHABBB	EBAACCGGDDBCBABAEHABBB
	EBAACCGGDDBCBABBEHABBB	EBACCCGADDBCBABBHDABBB
	EBACCCGGDDBCBABAFDABBB	EBACCCGGDDBCBABBFDABBB
AAAAFABDBB	EBACCCDGFDBCBADBFDABBB	
AAAAGBGDBC	EBAACCGAFDBCCDDBHHABBB	EBACCCGAFDBCCDDBHDABBB
AAAAKBADBB	EBACCCGGEDBCBADBFDABBB	
AAAAKBBDBB	EBACCCFGFDBCBADBFDABBB	EBAACCGGEDBCBABBEHABBB
	EBACCCGGEDBCBABAFDABBB	EBACCCGGEDBCBABBFDABBB
AAAAKBFDBB	EBAACCFGFDBCBABBEHABBB	EBACCCFGFDBCBABAFDABBB
	EBACCCFGFDBCBABBFDABBB	
AAAAKBIDBC	EBACCCGEFDBCCABAFDABBB	EBACCCGEFDBCCABBFDABBB
AABBEAEBBB	EBACBCGGDCBCBABAFDABBA	EBACBCGGDCBCBABBFDABBA
AABBKBIBBC	EBACBCGEFCBCCABBFDABBA	
AABCEAEBBB	EBACBBGGDCBCBABAFDABBA	EBACBBGGDCBCBABBFDABBA
AACBKBIABC	EBBBACGEFBBCCABBDGABBB	EBBBACGEFBBCCABBEGABBB
ABCDGBGABC	EBCBAAGAFBBCCDDBHHABBB	
ABCDKBKABC	EBCBAAGGFBBBCAABHHABBB	EBCBAAGGFBBCCAABHHABBB
BAAAEAADBB	FCACCCGGDDBCBADAEDABBB	FCACCCGGDDBCBADBEDABBB
BAAAEAEDAB	FCACCCGGDDBCBABAECBABB	FCACCCGGDDBCBABBECBABB
BAAAEAEDBB	FCAACCGGDDBCBABBEHABBB	FCACCCGADDBCBABBGDABBB
	FCACCCGGDDBCBABAEDABBB	FCACCCGGDDBCBABBEDABBB
BAAAFABDBB	FCACCCDGFDBCBADBEDABBB	
BAAAGBGDBC	FCACCCGAFDBCCDDBGDABBB	
BACBGBGABC	FCBBACGAFBBCCDDBGGABBB	
BACBIBIABC	FCBBACGCFBBCCBBBHHABBB	
BACBKBIABC	FCBBACGEFBBCCABAEGABBB	FCBBACGEFBBCCABBEGABBB
BACDGBGABC	FCBBAAGAFBBCCDDBGGABBB	
BACDIBIABC	FCBBAAGCFBBCCBBBHHABBB	
BBCDGBGABC	FCCBAAGAFBBCCDDBHHABBB	
BBCDIBIABC	FCCBAAGCFBBCCBBAHHABBB	FCCBAAGCFBBCCBBBHHABBB
BBCDKBKABC	FCCBAAGGFBBBCAABHHABBB	FCCBAAGGFBBCCAABHHABBB
CADBAAACBB	BAACACGBDAACBDDAHHABBB	

77

Table B-22 (Continued)

CROSS REFERENCE OF 10-DIMENSION BINS WITH 22-DIMENSION CENTRAL ESTIMATE BINS

10 Dimension Bins	22-Dimension Bins Included in New 10-Dimension Bin	
CADBAAADBB	DAAAACGBDDACBDDAHHABBB	
CADBEAEABB	CAACACBGDABCBABBABABAB	
CADBEAECBB	BAACACGBDAACBBBBHHABBB	
CADBEAEDBB	DAAAACGBDDACBBBBHHABBB	DABAACGADDACBBBBHGABAB
CADDEAEABB	CAACAABGDABCBABBABABAB DAAAAAGBDABCBBBBHHABBB	DAAAAAGBDABCBBBAHHABBB DABAAAGADABCBBBBHGABAB
CADDIBIABC	DAAAAAGBFABCCBBBHHABBB	
CADDIBIDBC	DAAAAAGBFDACCBBBHHABBB	
CBDDEAEDBC	DACAAAGADDACCBBBHHABBB	
CBDDKBKABC	BACBAAGGFABCCAABHHABBB	
DADBEAEABB	AAACACGGDABCBABBECABBB	
DBDDKBKABC	AACBAAGGFABCCAABHHABBB	

Truncation of Accident-Progression Bins

Because of the very large number of accident-progression bins resulting from the Peach Bottom CET analysis (more than 3500 were identified), it was expedient to drop from consideration those bins which would not significantly impact risk (due either to low probability or low source-term magnitude). A collapsing process was used to discard those bins which had both a frequency of occurrence below a pre-selected cut-off value and a frequency-weighed estimated source term which was less than a second cut-off value. The cut-off values were selected such that the analysts expected no significant reduction in the accuracy of the results.

The importance of each bin in terms of risk was estimated based on an approximate calculation of the source term. The approximate source term was expressed as the equivalent cesium release faction (the release fraction for the cesium group which the MACCS code would predict to induce similar late effects as for the set of release fractions for nine groups considered). The equivalent release fraction of cesium was assumed to be proportional to offsite consequence of release. A weighted fractional frequency for each bin was calculated by multiplying the conditional probability of the bin (probability of the bin given the occurrence of the associated plant-damage state) by the relative contribution to core-damage frequency of the associated damage state and by the equivalent release fraction. The bins contributing to the

78

central estimate were then ordered by decreasing weighted fractional frequency. The weighted fractional frequencies were summed. The bins were then taken in order until the total weighted fractional frequency for the bins taken equalled at least 90% of the original total. Bins with conditional probability greater than 10% were than added to the list of those taken if they were not already present. The risk which was associated with the bins not taken (which total less than 10% of the total weighted fractional frequency) was represented by adjusting the conditional probability of the remaining bins such that the total weighted fractional frequencies of those bins equalled the original total. The adjustment was made in proportion to the weighted fractional frequency of the bin (i.e., such that the bin with the highest risk would represent the largest portion of the risk which would have been neglected had the bins assessed to have a low contribution been simply neglected).

This procedure was implemented by POSTSM, the EVNTRE post-processor. Approximate source terms for each bin were estimated by PBSOR, the integral parametric source-term model which had originally been developed to approximate STCP results for Peach Bottom. PBSOR was superceded by RELTRAC for the actual estimation of source terms for the bins that were not truncated when the need for more accurate source-term assessments became apparent.

The efficacy of the above method for reducing the number of source term and consequence calculations required was clearly demonstrated in the course of the analysis. The CET analysis indicated hundreds to thousands of possible accident-progression bins as outcomes, but source term and consequences were estimated for a much smaller number which were estimated to be important in terms of frequency or risk. The accuracy of this approach has not been fully investigated. However, comparisons between the source-term weight calculated by PBSOR and the equivalent cesium release fraction based on RELTRAC results gives the analysts reasonable confidence that the error introduced is relatively small (compared to other sources of inaccuracy in the analysis).

B.2.2 Source Term Code Package Calculations

The source term code package runs that served as the basis for this analysis are discussed in a separate report by Battelle Columbus Laboratories, *Radionuclide Release Calculations for Selected Severe Accident Scenarios: BWR, Mark I Design* [7]. These analyses served as the basis for the central estimates. The SARRP study involved many combinations of accident conditions not specifically studied, the source terms for which were derived from the five basic scenarios covered in the Battelle work. These scenarios are described briefly below.

> TC1 Sequence. This sequence involves a scenario in which drywell failure precedes core damage. This failure results in the loss of injection to the vessel and core damage ensues. This is an ATWS sequence, and successful vessel depressurization and initial water level control is assumed.
>
> TC2 Sequence. This scenario also involves ATWS. However, vessel depressurization is not accomplished. High pressure injection is assumed to fail as a result of elevated suppression pool temperature. Core damage ensues in an intact containment. Drywell failure occurs immediately following vessel breach.
>
> TC3 Sequence. This scenario is similar to TC2, described above. However, the containment is successfully vented, through the suppression pool (wetwell) prior to vessel breach. There is never leakage from the drywell.
>
> TB1 Sequence. This is a station-blackout scenario in which turbine-driven pumps initially supply core cooling. Depletion of the batteries causes these pumps to fail, and the vessel remains at high pressure up until vessel breach. The drywell fails late as the result of slow pressurization.
>
> TB2 Sequence. This sequence is similar to TB1, described above. However, drywell failure is assumed to result from the containment pressurization which accompanies vessel breach.

Battelle also analyzed an interfacing-systems LOCA scenario ("V" sequence) using the STCP. It was, however, the concensus of the ASEP and SARRP analysts, with agreement from at least some of the review team members, that this sequence was not sufficiently likely to warrant further consideration. Thus, these STCP results were not included in the current work.

The Battelle report provides the release fractions to the drywell or wetwell for three phases of the accident: the in-vessel release period, a puff release associated with a blowdown following vessel breach, and a core-concrete interaction release. Information concerning timing and other physical aspects of the accident are also provided. As described in the following sections, the Battelle work was the starting point for both the central estimate and the LLH source-term analyses which were performed with RELTRAC.

B.2.3 Methodology for the Estimation of Source Terms: RELTRAC

Since the Battelle analysis was limited in terms of the different scenarios considered, and because the LLH uncertainty analysis required the estimation of source terms considering phenomenology not currently included in the STCP, it was necessary to develop a methodology to efficiently estimate the source terms, retaining the ability to directly compare to the STCP results. In order to treat the potential accident scenarios and the LLH uncertainties in some detail, it was decided to use the RELTRAC code [16] which was developed specifically for the purpose of investigating the sensitivity and uncertainties in source term estimation. Only a brief overview of the RELTRAC code is included below. The code is fully discussed in its specific application to the Peach Bottom plant in Reference 16.

The philosophy in the implementation of RELTRAC for this analysis is similar to that for using SURSOR, SEQSOR, and GGSOR in the analysis of other SARRP reference plants [5, 6, 17] These previous codes are also parametric source-term models. However, they are parametric in integral fission-product release. RELTRAC is parametric in the rate equations that govern release. The form of the rate equations for each of the processes which RELTRAC models is intrinsic to the code. These forms were determined by the analysts after careful review of the STCP results both for Peach Bottom and Grand Gulf. In addition, BMI-2104 and the results of independent calculations, with CORCON and other portions of the STCP, were reviewed. The RELTRAC rate equations include a number of constants which form a part of the code input. RELTRAC was "tuned" such that its predictions closely match those of the STCP, for five sequences described in the previous section, by adjusting these input constants. In this manner RELTRAC was made to approximate not only environmental release fractions predicted by the STCP, but also the distribution of fission products within the containment. This ability to represent intermediate results gives greater confidence that the effects of deviations of the accident progression from that modeled by the STCP are more accurately represented than was possible using the integral models for the other plants.

RELTRAC is essentially a control-volume or compartment model. The movements of fission-product species between compartments are represented by a system of ordinary differential equations. Integration of this system of equations provides a prediction of the distribution of fission products among the compartments as a function of time. The compartments used to represent the Peach Bottom containment are the following:

(1) The fuel
(2) The vessel atmosphere
(3) The vessel surfaces
(4) The drywell atmosphere
(5) The drywell surfaces
(6) The suppression pool
(7) The reactor building atmosphre
(8) The reactor building surfaces
(9) The environment

The complexity of the rate equations varies from a simple decontamintion factor representation (rate of removal from a flow for a fission product species proportional to the inflow rate to the volume), such as for the suppression pool retention and deposition on surfaces in the reactor building, to the solution of the MAEROS aerosol equations [18] for deposition in the drywell. Integration of the rate equations does not proceed over discontinuities. These discontinuities result from events in the accident progression, such as vessel breach or rapid depressurization of the containment when a rupture occurs. Discontinuities such as these are modeled in RELTRAC as instantaneous redistributions of the fission products among the compartments. For instance, if the containment ruptures in the drywell, essentially all fission products which are airborne in the drywell are instantaneously transported to the reactor building (further redistribution is subsequently calculated before integration of the rate equations resumes).

RELTRAC output consists of the fraction of the initial inventory of each fission product group released, and the length of time over which that release occurs, for both the period immediately following containment failure and for the succeeding period, up to the end of the calculation. These results are in a form suitable for input to CRAC2 and MACCS. Other output, for input to CLUSTER and for diagnostic purposes, is also produced. The fission product groups considered were based on those used in the *Reactor Safety Study* [9]. These basic groups were retained for the SARRP radionuclide group definition both because they continue to provide a fairly effective means of grouping the radioactive species and because they have served as the standard for the consequence analysis and comparison to other studies. Two changes were made to better discriminate certain types of releases: groups 5 and 7 were each divided into two groups as defined below. In the RELTRAC code, volatile iodine was separated from iodine, but these two categories were added back together in terms of the results. The release groups used for Peach Bottom in SARRP are listed below.

Group	Key Radionuclides	Release Type
1	Xe, Kr	Noble gas release
2	I, Br	Halogens (the SARRP bin includes organic iodide)
3	Cs, Rb	Alkali metals
4	Te	Tellurium, also includes Se and Sb
5	Sr	Strontium
6	Ru	Noble metals, also includes Mo, Pd, Rh, and Tc
7	La	Lanthanum group, also including Cm, Nd, Nb, Eu, Y, Pr, Pm, Sm, and Zr.

Group	Key Radionuclides	Release Type
8	Ce	Cerium group, also includes Np and Pu (part of group 7 in RSS)
9	Ba	Barium (part of group 5 in RSS)
10	Volatile I	Volatile iodine was treated separately in RELTRAC, but added back in to the iodine release in all results.

As noted previously, the code was benchmarked against the STCP results described in the previous section to test its accuracy in estimating source terms in a manner compatible with that code. In benchmarking the RELTRAC predictions to the STCP results, the values of input parameters (coefficients and constants in the rate equations) were adjusted to obtain optimal agreement between the two codes. Five sets of parameter vales were derived from this exercise, one for each STCP run. Not all of the sets were independent. The TB1 and TB2 sequences are essentially similar up to the time of vessel meltthrough. Therefore the parameter values used to model the accident up to the time of vessel breach were identical between these two parameter sets. For instance, the rate constants describing the release from the fuel in-vessel were the same. The in-vessel portion of the TC2 and TC3 scenarios were also similar. Duplication of values for some parameters between the five sets was therefore present.

Some parameter values could only be assessed based on a single STCP scenario. For example, the decontamination factor for core-concrete releases passing through the suppression pool could be readily assessed only from the TC3 scenario. While values can be estimated based on the TB1 and TC2 results, assumptions must be made as to gas flow rates which make the results obtained subject to error. Because of the limited information contained in the five STCP calculations, some possible effects of accident progression on the source terms were not modeled. For instance, the SPARC model shows a dependence of pool decontamination factor on the temperature of water in the pool (e. g., whether or not the pool is saturated relative to atmospheric pressure). For all five of the STCP scenarios, the suppression pool temperature is similar. Thus the possible impact of pool temperature on scrubbing efficiency is not modeled in the current analysis. (It should be noted that RELTRAC could model such dependency if enough information was available to define it.)

Good agreement between the STCP results and RELTRAC was generally obtained. Release fractions to the environment were generally replicated within a factor of 20% (plus or minus) for most radionuclide groups. It was harder to match the final distribution of radionuclides in containment. Factor of two differences with respect to these quantities were observed. Results of the comparisons, which illustrate a sufficient accuracy (for this type of uncertainty characterization) in the RELTRAC code, are discussed in Reference 13.

B.2.4 Development of Source Terms for the Central Estimate

The source terms for the central-estimate bins were calculated using relatively simple parametric models of the release processes as represented in RELTRAC. RELTRAC allowed the source terms for different scenarios to be calculated from available STCP runs with alterations to account for bin-specific conditions. The approach taken was to use the set of parameter values (obtained from the STCP benchmarking exercise) which corresponded to the scenario which most closely matched the definition of the accident-progression bin for which a source-term estimate was required. These parameter values were altered to account for features of the accident progression represented by the bin which had not, or could not, be treated with the STCP. As much as possible, the alterations were set to mimic the STCP treatment, although in some cases the sequence conditions did not correspond too closely to any available run, and considerable analyst judgment was involved in formulating a parametric rate equation to represent the process involved. This is of concern in several areas. For example, the representation of what occurs if injection is restored to the RPV prior to vessel breach is based purely on the engineering judgment of the analysts. No STCP calculation for such a scenario has been run. (to the knowledge of the analysts). Even if such results were available, one would have to question their validity since the STCP models were not designed with such a scenario in mind.

As described in Section B.2.1, the results of the containment analysis were sorted into accident-progression bins to allow automated transition to the source-term analysis. The combination of bin parameters served directly to setup the RELTRAC code to simulated the boundary conditions of the accident progression bin under consideration. Release timing information is obtained directly from RELTRAC. The heat of release was estimated based on the most closely applicable STCP calculation, as represented by the features of the accident progression bin.

B.2.5 Development of Source Terms for LLH Analysis

The LLH source terms were also estimated with RELTRAC in a manner similar to the central estimate. The accident progression bin definition identified the specific boundary conditions for the calculation, while the combination of source-term issue levels were varied in 150 observations in the sample. Thus for each accident-progression bin, source terms were calculated for 150 different combinations of uncertainties, with the envelope of results representing the impact in source term space of the uncertainties considered in the process. This part of the analysis is therefore directly analogous to the calculations performed for the other SARRP reference plants [5, 6, 14], except that the parametric variation of the source term was considerably more detailed in RELTRAC than in the codes used for the other plants such a GGSOR and SURSOR.

The LLHissues are defined in Section B.1. It was necessary to translate the reviewers input (the weighs and levels) into a format consistent with RELTRAC. For the most part this meant transforming the integral release fractions defined by the levels of some issues into release rates. Inother cases, where a decontamination factors is required, no transformation was involved. Rather it was assumed that the specified decontamination factor applied to the rate process involved as opposed to being a factor applied directly to the integrated release. The difference here is significant only if the process involved is arrested prior to the endpoint assumed by the reviewers in assigning the weighting factors. For instance, the reviewers may have changed their weight assignments on the reactor building decontamination factor for the case that CCI is arrested after it began.

The use of RELTRAC may impose a general limitation on the use of the results from the LLH study. For the source-term issues, the levels were defined and weighting factors were solicited with the explicit understanding that the integral parametric model used in the SARRP analyses of Surry and Sequoyah (SURSOR and SEQSOR codes, respectively) would be used for Peach Botton also. The reviewers were not given the opportunity (due to time constraints) to review the implementation of these issues with the RELTRAC model. The analysts did attempt, howevr, to preserve the impact of these issues on the environmental release that is represented in the simpler, integral parametric model.

In the fillowing discussion, the implementation of each source-term issue within RELTRAC is briefly described.

SourceTerm Issue 1: In-Vessel Release from the Fuel The reviewers weighted levelsfor this issue which specified the integrated release, for each radionuclide group, from the fuel during the in-vessel phase of the accident (from the start of core damage to the time of RPVbreach). In RELTRAC, the release rate is modeled as an exponential function. The duration ofthe in-vessel phase is determined by the definition of the accident-progression bin. Thus RELTRAC was designed such that the required integral release is specified in the code input. The values of the rate constant in the exponential equation representing each radionuclide are then determined by the code such that the specified integral release from the fuel (to the vessel atmosphere) is realized at the time of vessel breach.

Source Term Issue 2: CsI Decomposition In-Vessel The reviewers considered the fraction of CsI which was decomposed in-vessel to volatile iodine plus cesium (presumably hydroxide). The representation within RELTRAC is straightforward. The rate of production for volatile iodine in-vessel is set equal to the fraction specified by the level for this issue, multiplied by the rate of production for the iodine group as derived for the previous issue.

Source Term Issue 3: Retention within the RPV The reviewers provided weights for levels of this issue which specified the fraction of the in-vessel release which was retained (presumably on vessel surfaces) following vessel breach. RELTRAC models this deposition by applying a deposition rate constant to the quantity of material suspended in the RPV atmosphere at any given time. The quantity suspended is derived based on an estimate of the average RPV residence time for fission products. The issue was modeled by adjusting the deposition rate constant so as to obtain a value for fractional deposition as close as possible to the specified level for this issue.

Source Term Issue 4: Suppression Pool Decontamination Factor for Aerosols. This value is an input parameter for RELTRAC. In the code it is used as the ratio of the outflow from the pool for a particular species to the inflow rate. In actuality, two values are associated with this issue: one for fission products entering the pool through the SRV spargers and one for fission products entering the pool through the drywell vents. Each level for this issue likewise specifies two values. However, because the experts considered aerosol/particle size in their assignments of weighting factors, it may be that their intent was to differentiate in-vessel releases from CCI releases rather than the SRV pathway from the vent pathway. It is only the possibility of a stuck-open SRV tailpipe vacuum breaker (allowing in-vessel releases to pass through the drywell vents) which may give rise to some misinterpretation in RELTRAC with regard to the reviewers' intent for this issue.

Source Term Issue 5: Suppression Pool Decontamination Factor for Volatile Iodine This value is also an input parameter to RELTRAC. It is defined in exactly the same manner for aerosols. Again, separate values for the SRV and vent pathways were allowed. The values specified by each level of the issue was applies to both pathways. This treatment closely reflects the reviewers' intentions on this issue.

Source Term Issue 6: Revolatilization of CsI and CsOH Initially Deposited on RPV Surfaces Subsequent to vessel breach, RELTRAC models revolatilization release as a rate of release from the RPV surfaces to the drywell atmosphere. The rate of release is proportional to the quantity of a radionuclide group present on RPV surfaces at a given instant. The constant of proportionality is an input parameter. The value of this parameter was adjusted such that the fractional release was close to the value specified by this issue at the end of the simulation. The constant was set to zero (no revolatilization) if vessel injection or drywell sprays were recovered (as designated by the accident-progression bin).

Source Term Issue 7: Release from the Melt During Core-Concrete Interactions The representation of this issue is similar to the in-vessel release issue (#1 above). The constants in the parametric release rate equation for each radionuclide group were calculated such that the integrated release from CCI at the end of the simulation was that specified in the level assigned for this issue.

Source Term Issue 8: Reactor Building and Refueling Bay Decontamination Factors As with the suppression pool decontamination factor, this parameter is part of the input to RELTRAC. The representation of this issue is thus similar to the pool decontamination issue. The value for the decontamination factor specified by the level is used directly in the RELTRAC model.

Source Term Issue 9: Late Releases of Iodine This issue is modeled in RELTRAC in a manner similar to the representation of revolatilization of material deposited on the RPV surfaces. The release rate of volatile iodine form the suppression pool (before and after RPV meltthrough) is proportional to the quantity of iodine contained at that instant. As for the revolatilization issue, the release rate constant is adjusted to closely approximate the integral release specified by the issue level at the end of the simulation. Because of variations in the rate iodine was deposited in the pool among the accident-progression bins, the evaluation of this constant did not always result in an integrated release to the environment for volatile iodine which closely correspond to that specified by the issue level. Integrated release were always smaller, sometimes substantially.

B.3 CLUSTERING OF PEACH BOTTOM SOURCE-TERM ESTIMATES

This section describes the clustering of the Peach Bottom LLH source terms for consequence calculations. The clusters were used to reduce the number of consequence calculations to a manageable number for the LLH risk calculation.

B.3.1 Introduction to the Clustering Process

The limited Latin hypercube sampling described in Section 2.2.2 of the main report involved nine source-term issues. The values for these issues, which are described in Section B.1 of this appendix, were varied independently in the 150 observations of the sample. For each observation, or sample member, the source term corresponding to each of the accident-progression bins would vary according to the combinations of levels for the nine issues which correspond to that observation. The LLH containment event analysis identified hundreds of distinct accident-progression bins. Evaluating the source term for each bin, considering 150 sets of source-term issues levels results in thousands of unique source terms. Consequence calculations, using CRAC2 and MACCS, for each source term would be prohibitively expensive. Thus the source terms were grouped such that a single consequence calculation for each group, representative of several hundred source terms within the group, could be performed.

The grouping was performed by a statistical technique known as clustering. The clustering process may be thought of as a discretization of the source-term space. Each source term is characterized by 18 release fractions (early and late releases for each of nine radionuclide release groups. If one considered plotting these source terms on an 18 axis coordinate system, the source-term points populate some region of this 18-dimensional space. The object of clustering is to subdivide the populated region of space in to N sub-regions. The points (source terms) within each sub-region form a cluster. The point at the center of a subregion (which has the characteristics of a source term) was taken to be the representative source term for all source terms in the sub-region. A consequence calculation was performed only for the single source term at the center of each cluster. The number of clusters (N) was chosen so as to minimize the error introduced by assuming that each source term in the cluster has identical consequences to the representative source term selected for the cluster. The clustering algorithm divides the populated region of the source term space into clusters by assigning each source term to a cluster such that the sum of the distances between each source term and the source term used to represent the center of the cluster is minimized.

Practical limitations required that the clustering be performed in a space with reduced dimensionality (less than 18). Just as an 18 dimension space is difficult to visualize, it is difficult, if not impossible, to work with it in the clustering process. Thus the clustering was performed in a space with reduced dimensionality (three dimensions for Peach Bottom) as described below. Consequence calculations were performed for the accident progression bins (including the appropriate levels of the source term issues) which most closely resembled the average characteristics of the source-term estimates assigned to the cluster. In other words, the cluster was represented by the accident-progression bin for which the source term estimate was closest to the center of the cluster in the reduced space. The general criteria for acceptable clustering were that the clustering (1) does not introduce errors that were significant compared to the errors already present in the analysis, and (2) preserves the relationships between important inputs to the analysis and consequences of interest. The clustering process is based upon consideration of the source term characteristics that most strongly influence the consequences. Previous studies [16,17] indicate that the most important source term characteristics are, in approximate order of decreasing importance:

- Magnitude of the release,
- Warning time before the release,
- Duration of the release,
- Time of release,
- Energy of the release, and
- Height of the release.

The magnitude of the release is by far the most important. Warning time impacts the early effects, though, by influencing whether emergency measures can be effective. Duration determines both the dispersion of the plume and the extent to which evacuees are exposed to it. The other characteristics are of secondary importance. Timing, aside from duration and warning time, may allow for decay of some short-lived radionuclides before release and thus impact some early effects. Energy and height of release influence close-in doses by determining the location and time of plume touchdown.

The magnitude of the release for each observation and release category was estimated using RELTRAC (as described in Section B.2). The other characteristics important to the consequence estimates (timing, energy, etc.) of each source-term estimate were also estimated.

Reduction of the dimensionality of the source-term space approximately conserves the magnitudes of the source term. Timing of the release is also roughly represented in the reduced dimensions. The release was divided into two time periods: early and late. The early time period is defined to be that portion of the release to the environment which occurs prior to the failure of the RPV. All subsequent releases are classified as late.

It is the intent of clustering to conserve the predicted consequences of a release. The consequences corresponding to the cluster center should be roughly equal to the consequences for each source term in the cluster. Thus, in attempting to conserve the magnitude of the source term in the reduced space, it is actually the magnitude of the predicted consequences one wishes to conserve. With this in mind, the nine release fractions for each radionuclide group were expressed in terms of the quantity of a single radionuclide which would, if released in the same manner, produce similar consequences. When the offsite consequence considered is an early effect (early illness, early fatality, or individual risk of fatality) the release is expressed in terms of the fraction of the core inventory of the iodine group which would have to be release to obtain the same 24 hour average bone marrow and lung dose as the combination of release fractions from the nine groups. For late effects (latent cancers, population dose) an equivalent release for the cesium group is formulated. In this manner, any release (set of nine release fractions) can be expressed as equivalent iodine (for early effects) and cesium release (for late effects). The following expression is employed.

$$E_i = \sum_{n=1}^{9} W_{ni} F_{ni}$$

where

E_i = is the equivalent release fraction for group i (i = 1 or 2, iodine or cesium)

W_{ni} = is the early (i = 1) or late (i = 2) effect weight for the nth isotope group, derived from Reference 9 and reproduced in Table B-23.

F_{ni} = is the early (i = 1) or late (i = 2) release fraction for the nth isotope group

For each source term , three equivalent release fractions, or consequence weights, were calculated:

1) The early effect of early release (EEER) which is the iodine equivalent release for releases occurring before vessel breach.
2) The early effect of late releases (EELR) which is the iodine equivalent release for releases occurring after vessel breach.
3) The late effect (LE) which is the cesium equivalent release for the total (early plus late) releases.

90

Note that EEER is zero if containment integrity is lost following vessel breach. EELR and LE are always non-zero, but are very small in the absence of containment failure. The use of early and late effects weights approximately preserves the timing information (principally warning time). The consequence weights constitute the dimensions of the reduced source-term space.

For Peach Bottom, three dimensions were used to define the reduced source term space. Clustering was performed in this three-dimensional space. Source terms within a given cluster have similar values of the three source-term measures (EEER, EELR, LE). As a result, source terms having zero early releases (EEER = 0) are not grouped with source terms with non-zero early release. After the cluster centers in the reduced space were found, they were transformed back to the original space. This transformation was accomplished by selecting the source term estimate which is closest (smallest Euclidean distance) to the center of the cluster in the three-dimensional space. The center is determined by taking the average coordinate, for each dimension, considering each source term estimate in the cluster.

A main approximation used in the reduction of the source-term space was that all consequences behave either as early health effects or as late health effects with respect to release magnitudes.

Table B-23

EARLY AND LATE EFFECT WEIGHTS OF SOURCE TERM GROUPS

Group	Early Effect Weights Bone[1]	 Lung	 Average	Late Effect Weights[2]
1	0.1	0.05	0.08	0.001
2	1.0	1.0	1.0	0.1
3	0.1	0.09	0.1	1.0
4	0.9	0.7	0.8	0.104
5	0.7	0.9	0.8	0.7
6	0.4	3.8	2.1	1.1
7	2.8	14	8.4	2.6
8	1.6	14	7.8	5.4
9	1.5	0.6	1.1	2.6

[1] 24 Hour bone dose

[2] Total cancers

B.3.2 Clustering Procedure

The clustering process was carried out using an interactive cluster analysis code, CLUSTER, that was developed in the Phenomenology and Risk Uncertainty Evaluation Program (PRUEP). The clustering is based on a nearest neighbor approach using a modified Euclidian distance:

$$d_{ij} = \{\sum_k W_k (x_{kj} - x_{kl})^2\}^{1/2}$$

where

d_{ij} = the distance between points i and j
x_{kl} = the k^{th} coordinate of the l^{th} point
W_k = the weight of the k^{th} coordinate.

In this analysis, the three coordinates for each point are EEER, EELR, and LE defined above. The weights, W_k, are chosen to reduce dispersion within the dimensions for the resulting clusters, but are otherwise arbitrary. The clustering of the source terms in the reduced dimensions was accomplished using the following iterative procedure:

1. Obtain an initial set of clusters. Several procedures are available for obtaining initial cluster centers: random selection of points from observation, discretizing the distance from the origin ($X_1 = 0, X_2 = 0, X_3 = 0$), or a maximum distance algorithm [18].
2. Use the K means algorithm [19] to optimize the center positions and assignments. The K means algorithm is as follows:
    - (a) Obtain starting cluster centers:
    - (b) Map all data points onto the centers based upon shortest distance to a center;
    - (c) Find the new center positions by averaging the position of the points assigned to the individual clusters; and
    - (d) If any center position has changed, go back to step (a), otherwise stop.
3. For the reduced dimension, plot the value versus the assigned cluster.
4. If the dispersion in a dimension for a cluster is unacceptable, split the cluster and return to step (2), otherwise go to step (5).
5. Back out the average cluster centers in the original space using the cluster assignments found in step (2).

The stopping criterion is not rigorous. In practice, the clustering was considered acceptable if the dispersion within a dimension was less than a factor of two for clusters with large releases, and less than a factor of 10 for small releases. The results of the clustering procedure are provided in the next section.

92

B.4 RESULTS OF THE RADIOLOGICAL SOURCE-TERM ANALYSIS

This section lists the results of the source-term analyses for Peach Bottom in terms of the release fractions and characteristics of each accident-progression bin and cluster. The important source-term estimates are listed in Section 5.3 of the main report, this appendix contains the complete list of source terms for further reference.

B.4.1 Source-Term Results for the Central Estimate

The results of the central estimate source-term analysis for all 77 central accident-progression bins is provided in this section. Although the bins are defined by the 22-character designator defined in Section B.2, consecutive number designators were also used to identify the bins in some of the calculations. Table B-24 supplies the cross-reference between the central-estimate bins and the numbers assigned to those bins. It must be emphasized that the number designators for bins only apply to the central estimates. The LLH bins have the same letter designators but there is no numbering scheme. (The LLH clustered source terms are assigned numbers however.)

The central estimate source terms for the central estimate accident progression bins are listed in Table B-25 for the MACCS estimate of consequences, and in Table B-26 for the CRAC2 consequence estimates. The two tables differ only in the timing of the release, as the MACCS code has the flexibility to treat the timing more accurately.

B.4.2 LLH Source-Term Results

As described in Section 2.5, the RELTRAC code was used to calculate the LLH source terms, and since practical limitations preclude the calculation of consequences for such a large number of source terms, they were clustered as described in the previous section. The release fractions for the 54 clusters that were used are provided in Tables B-27 and B-28 for the MACCS and CRAC2 calculations, respectively.

Table B-24

CROSS REFERENCE FOR CENTRAL ESTIMATE BIN NUMBERS WITH 22-DIMENSION BIN DESIGNATORS

Bin #	Designator	Conditional[1] Probability	Bin #	Designator	Conditional[1] Probability
1	AAACACGGDABCBABBECABBB	0.0378	40	EBACCCGGDDBBBABAFDABBB	0.0000
2	AACBAAGGFABCCAABHHABBB	0.0618	41	EBACCCGGDDBBBABBFDABBB	0.0000
3	BAACACGBDAACBBBBHHABBB	0.0061	42	EBACCCGGDDBCBABAFCBABB	0.0000
4	BAACACGBDAACBDDAHHABBB	0.0000	43	EBACCCGGDDBCBABAFDABBB	0.0000
5	BACBAAGGFABCCAABHHABBB	0.0286	44	EBACCCGGDDBCBABBFCBABB	0.0341
6	CAACAABGDABCBABBABABAB	0.0000	45	EBACCCGGDDBCBABBFDABBB	0.3000
7	CAACACBGDABCBABBABABAB	0.0000	46	EBACCCGGDDBCBADAFCBABB	0.0000
8	DAAAAAGBDABCBBBAHHABBB	0.0000	47	EBACCCGGDDBCBADAFDABBB	0.0000
9	DAAAAAGBDABCBBBBHHABBB	0.0174	48	EBACCCGGDDBCBADBFDABBB	0.0846
10	DAAAAAGBFABCCBBBHHABBB	0.0000	49	EBACCCGGEDBCBABAFDABBB	0.0000
11	DAAAAAGBFDACCBBBHHABBB	0.0000	50	EBACCCGGEDBCBABBFDABBB	0.0331
12	DAAAACGBDDACBBBBHHABBB	0.0122	51	EBACCCGGEDBCBADBFDABBB	0.0000
13	DAAAACGBDDACBDDAHHABBB	0.0000	52	EBBBACGEFBBCCABBDGABBB	0.0000
14	DABAAAGADABCBBBBHGABAB	0.0019	53	EBBBACGEFBBCCABBEGABBB	0.0000
15	DABAACGADDACBBBBHGABAB	0.0014	54	EBCBAAGAFBBCCDDBHHABBB	0.0000
16	DACAAAGADDACCBBBHHABBB	0.0000	55	EBCBAAGGFBBBCAABHHABBB	0.0000
17	EBAACCFGFDBCBABBEHABBB	0.0000	56	EBCBAAGGFBBCCAABHHABBB	0.0574
18	EBAACCFGFDBCBADBEHABBB	0.0000	57	FCAACCGGDDBCBABBEHABBB	0.0000
19	EBAACCGADDBCBABBHHABBB	0.0000	58	FCACCCDGFDBCBADBEDABBB	0.0095
20	EBAACCGAFDBCCDDBHHABBB	0.0000	59	FCACCCGADDBCBABBGDABBB	0.0000
21	EBAACCGGDDBCBABAEHABBB	0.0000	60	FCACCCGAFDBCCDDBGDABBB	0.0000
22	EBAACCGGDDBCBABBEHABBB	0.0175	61	FCACCCGGDDBCBABAECBABB	0.0000
23	EBAACCGGDDBCBADAEHABBB	0.0000	62	FCACCCGGDDBCBABAEDABBB	0.0000
24	EBAACCGGEDBCBABBEHABBB	0.0000	63	FCACCCGGDDBCBABBECBABB	0.0076
25	EBACBBGGDCBCBABAFDABBA	0.0000	64	FCACCCGGDDBCBABBEDABBB	0.0757
26	EBACBBGGDCBCBABBFDABBA	0.0247	65	FCACCCGGDDBCBADAEDABBB	0.0000
27	EBACBCGEFCBCCABBFDABBA	0.0000	66	FCACCCGGDDBCBADBEDABBB	0.0213
28	EBACBCGGDCBCBABAFDABBA	0.0000	67	FCBBAAGAFBBCCDDBGGABBB	0.0000
29	EBACBCGGDCBCBABBFDABBA	0.0193	68	FCBBAAGCFBBCCBBBHHABBB	0.0000
30	EBACCCDGFDBCBADBFDABBB	0.0000	69	FCBBACGAFBBCCDDBGGABBB	0.0000
31	EBACCCFGFDBCBABAFDABBB	0.0000	70	FCBBACGCFBBCCBBBHHABBB	0.0000
32	EBACCCFGFDBCBABBFDABBB	0.0331	71	FCBBACGEFBBCCABAEGABBB	0.0000
33	EBACCCFGFDBCBADBFDABBB	0.0428	72	FCBBACGEFBBCCABBEGABBB	0.0100
34	EBACCCGADDBCBABBHCBABB	0.0000	73	FCCBAAGAFBBCCDDBHHABBB	0.0000
35	EBACCCGADDBCBABBHDABBB	0.0000	74	FCCBAAGCFBBCCBBAHHABBB	0.0000
36	EBACCCGADDBCBDDBHDABBB	0.0000	75	FCCBAAGCFBBCCBBBHHABBB	0.0236
37	EBACCCGAFDBCCDDBHDABBB	0.0000	76	FCCBAAGGFBBBCAABHHABBB	0.0073
38	EBACCCGEFDBCCABAFDABBB	0.0000	77	FCCBAAGGFBBCCAABHHABBB	0.0311
39	EBACCCGEFDBCCABBFDABBB	0.0000			

---

[1] Conditional probability (truncated to 0.0001) of the bin given core damage. Bins with zero probability do not contribute to the central estimate base case, but are used to evaluated the central estimate of safety options.

94

Table B-25

PEACH BOTTOM CENTRAL ESTIMATE RELEASE FRACTIONS FOR FOR THE MACCS CONSEQUENCE ESTIMATE

		Rel[2]			Evac.[2]		Release Fraction By Group[3]								
	Cond.[1]	Time	Dur[2]	Elev[2]	Time	Heat	1	2	3	4	5	6	7	8	9
Bin	Prob.	(hr)	(hr)	(m)	(hr)	(cal/s)	Kr-Xe	I	Cs-Rb	Te	Sr	Ru	La	Ce	Ba
1	.04	3.1	0.01	30	3.1	9.3+7	8.5-1	6.4-6	7.5-6	4.9-6	0.0	0.0	0.0	0.0	2.8-8
		3.1	13.6	30		9.0+3	1.5-1	3.4-4	3.1-4	4.7-3	1.4-2	6.1-8	4.8-4	9.5-4	1.0-2
2	.06	3.1	0.0	30	3.1	9.3+7	8.5-1	6.4-6	7.5-6	4.9-6	0.0	0.0	0.0	0.0	2.8-8
		3.1	13.6	30		4.5+5	1.5-1	9.8-4	8.6-4	7.1-3	2.3-2	8.6-8	7.2-4	1.4-3	1.6-2
3	.006	2.9	0.1	30	3.1	5.8+8	8.4-1	4.3-7	2.3-7	4.1-6	0.0	0.0	0.0	0.0	9.9-8
		2.9	13.8	30		9.0+5	1.6-1	5.3-3	5.4-3	5.2-2	1.6-1	6.8-7	5.3-3	1.1-2	1.1-1
4	0.0	2.9	0.19	30	3.1	8.4+7	9.6-1	5.0-4	6.0-4	6.3-4	0.0	0.0	0.0	0.0	1.0-5
		3.1	13.6	30		4.6+6	4.0-2	1.5-2	1.5-2	7.7-2	2.6-1	9.5-7	7.9-3	1.6-2	1.8-1
5	.03	16.8	0.0	30	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	0.0	2.0	0.5	30	3.1	5.6+5	1.8-1	2.7-7	4.4-7	1.3-6	0.0	0.0	0.0	0.0	3.3-8
		2.5	14.3	30		8.6+3	7.8-1	1.1-5	1.3-5	8.6-6	0.0	0.0	0.0	0.0	5.9-8
7	0.0	2.0	0.75	30	3.1	3.5+5	3.8-1	3.1-7	5.0-7	1.5-6	0.0	0.0	0.0	0.0	3.9-8
		2.8	14.0	30		8.7+3	6.2-1	1.6-3	1.6-3	1.6-2	4.9-2	2.1-7	1.6-3	3.3-3	3.4-2
8	0.0	3.4	0.1	30	3.1	4.7+7	8.4-1	7.8-8	4.6-8	4.2-7	0.0	0.0	0.0	0.0	2.1-8
		3.4	13.6	30		9.0+3	1.2-1	3.2-4	3.5-4	1.1-3	0.0	0.0	0.0	0.0	3.3-6
9	.02	3.4	0.1	30	3.1	4.7+7	8.4-1	3.9-7	2.3-7	2.1-6	0.0	0.0	0.0	0.0	1.1-7
		3.4	13.6	30		9.0+3	1.2-1	1.6-3	1.8-3	5.6-3	0.0	0.0	0.0	0.0	1.6-5
10	0.0	3.4	0.1	30	3.1	4.7+7	8.4-1	3.9-7	2.3-7	2.1-6	0.0	0.0	0.0	0.0	1.1-7
		3.4	13.6	30		9.0+3	7.0-2	6.0-5	1.1-4	4.8-4	0.0	0.0	0.0	0.0	1.5-6
11	0.0	3.4	0.1	30	3.1	2.4+9	8.4-1	5.8-6	1.7-5	1.6-4	0.0	0.0	0.0	0.0	1.8-6
		3.4	13.6	30		1.3+6	7.0-2	6.0-5	1.1-4	4.9-4	0.0	0.0	0.0	0.0	1.6-6
12	.01	3.4	0.1	30	3.1	2.4+9	8.4-1	5.8-6	1.7-5	1.6-4	0.0	0.0	0.0	0.0	1.8-6
		3.4	13.6	30		1.3+6	1.6-1	6.8-3	7.0-3	5.7-2	1.6-1	6.8-7	5.3-3	1.1-2	1.1-1
13	0.0	3.4	0.4	30	3.1	1.8+9	9.6-1	4.7-3	5.1-3	8.9-3	0.0	0.0	0.0	0.0	3.5-5
		3.4	13.6	30		6.4+6	4.0-2	1.5-2	1.5-2	7.7-2	2.6-1	9.5-7	7.9-3	1.6-2	1.8-1
14	.002	2.3	0.25	30	3.1	1.0+6	2.5-1	9.8-5	1.9-4	5.5-4	0.0	0.0	0.0	0.0	5.0-5
		2.5	14.5	30		8.5+3	7.1-1	4.1-3	4.6-3	1.6-2	0.0	0.0	0.0	0.0	1.1-4
15	.001	2.3	0.47	30	3.1	2.9+7	9.0-1	3.4-4	6.6-4	4.0-3	0.0	0.0	0.0	0.0	1.0-4
		2.7	14.2	30		1.2+6	9.8-2	9.0-3	9.4-3	6.4-2	1.6-1	6.8-7	5.3-3	1.1-2	1.1-1
16	0.0	2.3	0.25	30	3.1	5.4+7	2.5-1	9.8-5	1.9-4	5.5-4	0.0	0.0	0.0	0.0	5.0-5
		2.5	14.5	30		1.2+6	5.9-1	2.2-4	4.3-4	3.3-3	0.0	0.0	0.0	0.0	4.6-5
17	0.0	8.8	0.5	30	3.1	0.0	1.5-1	1.1-5	4.4-8	1.4-3	8.1-5	3.5-9	1.0-4	1.1-4	6.2-4
		9.3	7.75	30		2.1+5	8.0-1	2.4-5	3.7-8	6.0-3	1.0-4	9.9-9	2.9-4	2.7-4	1.4-3
18	0.0	8.8	0.5	30	3.1	0.0	1.5-1	3.2-5	1.2-7	2.2-3	1.3-4	5.0-9	1.5-4	1.7-4	9.8-4
		9.3	7.75	30		1.0+6	8.0-1	6.8-5	1.0-7	9.1-3	1.7-4	1.4-8	4.3-4	4.0-4	2.3-3
19	0.0	2.5	2.5	30	3.1	1.5+5	9.4-1	6.5-3	1.5-2	2.1-2	6.8-2	7.8-8	3.2-3	5.1-3	3.2-2
		5.0	12.0	30		1.3+5	6.1-2	1.8-2	1.3-2	2.4-1	3.9-1	8.0-7	3.2-2	4.7-2	3.0-1
20	0.0	2.3	0.5	30	3.1	3.7+6	5.2-1	5.7-4	1.0-3	8.1-4	0.0	0.0	0.0	0.0	1.5-4
		2.8	14.2	30		5.6+5	4.8-1	2.7-3	4.9-3	2.8-2	1.8-2	6.8-7	1.3-3	2.0-3	1.3-2
21	0.0	3.9	0.0	30	3.1	1.3+8	7.5-1	1.9-5	2.2-5	7.6-6	0.0	0.0	0.0	0.0	1.6-7
		3.9	13.1	30		1.2+5	2.5-1	4.9-3	5.6-3	5.2-2	9.1-2	1.8-7	7.0-3	1.0-2	6.6-2
22	.02	3.9	1.1	30	3.1	3.2+5	9.3-1	6.5-3	1.5-2	2.1-2	6.8-2	7.8-8	3.2-3	5.1-3	3.2-2
		5.0	12.0	30		1.3+5	6.6-2	1.8-2	1.3-2	2.4-1	3.9-1	8.0-7	3.2-2	4.7-2	3.0-1

Table B-25 (Continued)

PEACH BOTTOM CENTRAL ESTIMATE RELEASE FRACTIONS FOR FOR THE MACCS CONSEQUENCE ESTIMATE

							Release Fraction By Group[3]								
Bin	Cond.[1] Prob.	Rel[2] Time (hr)	Dur[2] (hr)	Elev[2] (m)	Evac.[2] Time (hr)	Heat (cal/s)	1 Kr-Xe	2 I	3 Cs-Rb	4 Te	5 Sr	6 Ru	7 La	8 Ce	9 Ba
23	0.0	3.9	1.1	30	3.1	3.2+5	9.3-1	1.9-2	4.3-2	3.2-2	1.1-1	1.1-7	4.8-3	7.6-3	5.2-2
		5.0	12.0	30		6.6+5	6.6-2	5.2-2	3.6-2	3.6-1	6.2-1	1.1-6	4.8-2	7.1-2	4.8-1
24	0.0	8.9	0.1	30	3.1	6.5+7	8.9-1	6.2-5	2.7-7	7.4-3	4.8-4	1.9-8	5.4-4	6.0-4	3.4-3
		8.9	8.9	30		2.0+5	1.1-1	5.2-5	6.3-8	1.3-2	2.1-4	2.2-8	6.4-4	5.9-4	3.1-3
25	0.0	3.9	0.0	30	3.1	1.3+8	8.1-1	2.3-5	2.6-5	6.3-6	0.0	0.0	0.0	0.0	1.9-7
		3.9	13.1	30		9.3+3	1.3-1	1.3-3	3.1-3	4.4-3	1.4-2	1.6-8	6.8-4	1.1-3	6.9-3
26	.03	3.9	0.0	30	3.1	1.3+8	8.1-1	1.2-4	1.3-4	3.1-5	0.0	0.0	0.0	0.0	9.7-7
		3.9	13.1	30		9.3+3	1.3-1	6.6-3	1.6-2	2.2-2	7.2-2	8.2-8	3.4-3	5.4-3	3.4-2
27	0.0	7.0	0.1	30	3.1	4.7+7	8.3-1	4.5-7	2.7-8	4.9-5	8.3-6	1.3-9	2.3-6	3.1-6	1.9-5
		7.0	9.9	30		1.2+4	1.7-1	9.3-7	2.7-8	1.7-4	1.2-5	3.6-9	5.9-6	7.2-6	4.2-5
28	0.0	3.9	0.0	30	3.1	1.3+8	8.1-1	2.3-5	2.6-5	6.3-6	0.0	0.0	0.0	0.0	1.9-7
		3.9	13.1	30		9.3+3	1.9-1	1.5-3	3.3-3	6.6-3	1.8-2	2.4-8	9.7-4	1.5-3	9.6-3
29	.02	3.9	0.0	30	3.1	1.3+8	8.1-1	1.2-4	1.3-4	3.1-5	0.0	0.0	0.0	0.0	9.7-7
		3.9	13.1	30		9.3+3	1.9-1	7.4-3	1.6-2	3.3-2	9.0-2	1.2-7	4.9-3	7.6-3	4.8-2
30	0.0	4.0	1.0	30	3.1	0.0	6.3-1	1.7-2	3.1-2	1.9-2	5.9-2	5.9-8	2.6-3	4.1-3	2.8-2
		5.0	12.0	30		6.6+5	3.7-1	3.3-2	2.6-2	2.3-1	3.7-1	6.8-7	2.9-2	4.3-2	2.9-1
31	0.0	10.0	0.5	30	3.1	0.0	1.4-1	5.5-7	5.6-10	1.4-4	2.0-6	2.8-10	6.8-6	6.3-6	3.3-5
		10.5	6.5	30		2.5+5	7.7-1	1.2-6	5.7-10	5.7-4	2.9-6	7.9-10	2.0-5	1.6-5	8.0-5
32	.03	10.0	0.5	30	3.1	0.0	1.4-1	2.7-6	2.8-9	6.8-4	1.0-5	1.4-9	3.4-5	3.2-5	1.7-4
		10.5	6.5	30		2.5+5	7.7-1	6.1-6	2.9-9	2.8-3	1.5-5	3.9-9	9.9-5	8.0-5	4.0-4
33	.04	10.0	0.5	30	3.1	0.0	1.4-1	8.0-6	7.8-9	1.0-3	1.6-5	2.0-9	5.1-5	4.7-5	2.7-4
		10.5	6.5	30		1.2+6	7.7-1	1.8-5	8.0-9	4.2-3	2.3-5	5.5-9	1.5-4	1.2-4	6.4-4
34	0.0	2.5	2.5	30	3.1	1.5+5	9.4-1	5.4-3	1.3-2	1.9-2	6.8-2	7.4-4	3.2-3	5.1-3	3.2-2
		5.0	12.0	30		1.3+5	5.5-2	1.6-2	1.2-2	2.2-1	3.9-1	6.8-6	3.2-2	4.7-2	3.0-1
35	0.0	2.5	2.5	30	3.1	1.5+5	9.4-1	6.0-3	1.5-2	2.1-2	6.8-2	7.8-8	3.2-3	5.1-3	3.2-2
		5.0	12.0	30		1.3+5	6.1-2	1.8-2	1.3-2	2.4-1	3.9-1	8.0-7	3.2-2	4.7-2	3.0-1
36	0.0	2.5	2.5	30	3.1	7.3+5	9.4-1	2.1-2	4.5-2	3.3-2	1.1-1	1.1-7	4.8-3	7.6-3	5.2-2
		5.0	12.0	30		6.6+5	6.1-2	5.2-2	3.6-2	3.6-1	6.2-1	1.1-6	4.8-2	7.1-2	4.8-1
37	0.0	2.3	0.5	30	3.1	3.7+6	4.8-1	1.4-4	1.8-4	4.7-4	0.0	0.0	0.0	0.0	3.0-5
		2.8	14.2	30		5.6+5	5.2-1	2.6-3	4.6-3	2.7-2	1.8-2	6.8-7	1.3-3	2.0-3	1.3-2
38	0.0	7.0	0.1	30	3.1	6.5+7	8.3-1	2.7-6	2.6-7	2.6-4	6.1-5	8.3-9	1.3-5	1.8-5	1.1-4
		7.0	9.9	30		1.6+5	1.7-1	4.9-6	1.7-7	9.2-4	6.5-5	1.9-8	3.1-5	3.8-5	2.2-4
39	0.0	7.0	0.1	30	3.1	6.5+7	8.3-1	1.4-5	1.3-6	1.3-3	3.1-4	4.2-8	6.5-5	9.1-5	5.6-4
		7.0	9.9	30		1.6+5	1.7-1	2.5-5	8.4-7	4.6-3	3.3-4	9.6-8	1.6-4	1.9-4	1.1-3
40	0.0	3.9	0.0	30	3.1	1.3+8	8.1-1	4.2-5	3.8-5	8.5-6	0.0	0.0	0.0	0.0	3.5-7
		3.9	13.1	30		1.2+5	1.9-1	4.9-3	5.6-3	5.2-2	9.1-2	1.8-7	7.0-3	1.0-2	6.6-2
41	0.0	3.9	1.1	30	3.1	3.2+5	9.4-1	6.8-3	1.5-2	2.1-2	6.8-2	7.8-8	3.2-3	5.1-3	3.2-2
		5.0	12.0	30		1.3+5	6.4-2	1.8-2	1.3-2	2.4-1	3.9-1	8.0-7	3.2-2	4.7-2	3.0-1
42	0.0	3.9	0.0	30	3.1	1.3+8	8.2-1	3.2-5	3.6-5	8.7-5	1.1-6	7.4-5	1.1-6	1.1-6	1.3-6
		3.9	13.1	30		1.2+5	1.7-1	4.4-3	5.1-3	4.8-2	9.1-2	5.3-4	7.0-3	1.0-2	6.6-2
43	0.0	3.9	0.0	30	3.1	1.3+8	8.1-1	2.3-5	2.6-5	6.3-6	0.0	0.0	0.0	0.0	1.9-7
		3.9	13.1	30		1.2+5	1.9-1	4.8-3	5.6-3	5.2-2	9.1-2	1.8-7	7.0-3	1.0-2	6.6-2

Table B-25 (Continued)

PEACH BOTTOM CENTRAL ESTIMATE RELEASE FRACTIONS FOR FOR THE MACCS CONSEQUENCE ESTIMATE

		Rel[2]			Evac.[2]		Release Fraction By Group[3]								
	Cond.[1]	Time	Dur[2]	Elev[2]	Time	Heat	1	2	3	4	5	6	7	8	9
Bin	Prob.	(hr)	(hr)	(m)	(hr)	(cal/s)	Kr-Xe	I	Cs-Rb	Te	Sr	Ru	La	Ce	Ba
44	.03	3.9	0.89	30	3.1	4.1+5	9.3-1	3.5-3	7.8-3	1.3-2	3.6-2	2.9-3	1.7-3	2.7-3	1.7-2
		4.8	12.2	30		1.3+5	7.1-2	1.9-2	1.8-2	2.3-1	4.2-1	1.2-4	3.3-2	5.0-2	3.1-1
45	.30	3.9	1.1	30	3.1	3.2+5	9.4-1	6.4-3	1.5-2	2.1-2	6.8-2	7.8-8	3.2-3	5.1-3	3.2-2
		5.0	12.0	30		1.3+5	6.4-2	1.8-2	1.3-2	2.4-1	3.9-1	8.0-7	3.2-2	4.7-2	3.0-1
46	0.0	3.9	1.1	30	3.1	3.2+5	9.4-1	1.7-2	3.8-2	3.2-2	1.1-1	3.7-3	4.9-3	7.7-3	5.2-2
		5.0	12.0	30		6.6+5	5.8-2	4.7-2	3.2-2	3.2-1	6.2-1	5.1-5	4.8-2	7.1-2	4.8-1
47	0.0	3.9	1.1	30	3.1	3.2+5	9.4-1	1.8-2	4.2-2	3.1-2	1.1-1	1.1-7	4.8-3	7.6-3	5.2-2
		5.0	12.0	30		6.6+5	6.4-2	5.2-2	3.6-2	3.6-1	6.2-1	1.1-6	4.8-2	7.1-2	4.8-1
48	.08	3.9	1.1	30	3.1	3.2+5	9.4-1	1.8-2	4.2-2	3.1-2	1.1-1	1.1-7	4.8-3	7.6-3	5.2-2
		5.0	12.0	30		6.6+5	6.4-2	5.2-2	3.6-2	3.6-1	6.2-1	1.1-6	4.8-2	7.1-2	4.8-1
49	0.0	10.2	0.1	30	3.1	6.5+7	8.9-1	3.1-6	3.3-9	7.3-4	1.2-5	1.5-9	3.8-5	3.6-5	1.9-4
		10.2	6.8	30		2.3+5	1.1-1	1.7-6	4.8-10	9.2-4	3.2-6	1.1-9	3.0-5	2.3-5	1.2-4
50	.03	10.2	0.1	30	3.1	6.5+7	8.9-1	1.6-5	1.6-8	3.7-3	6.0-5	7.6-9	1.9-4	1.8-4	9.4-4
		10.2	6.8	30		2.3+5	1.1-1	8.5-6	2.4-9	4.6-3	1.6-5	5.7-9	1.5-4	1.2-4	5.8-4
51	0.0	10.2	0.1	30	3.1	3.3+8	8.9-1	4.5-5	4.6-8	5.5-3	9.7-5	1.1-8	2.8-4	2.7-4	1.5-3
		10.2	6.8	30		1.2+6	1.1-1	2.5-5	6.8-9	6.9-3	2.6-5	8.0-9	2.3-4	1.8-4	9.2-4
52	0.0	5.9	0.1	30	3.1	4.7+7	8.3-1	2.5-6	9.9-7	8.2-5	9.9-5	2.6-9	4.9-6	7.6-6	4.8-5
		5.9	11.1	30		1.1+4	1.7-1	6.3-6	1.2-6	5.2-4	1.8-4	1.4-8	2.5-5	3.6-5	2.2-4
53	0.0	6.7	0.1	30	3.1	4.7+7	8.3-1	6.9-7	6.6-8	6.3-5	1.6-5	1.8-9	3.2-6	4.6-6	2.8-5
		6.7	10.2	30		1.2+4	1.7-1	1.5-6	7.2-8	2.3-4	2.4-5	5.2-9	8.8-6	1.1-5	6.7-5
54	0.0	2.3	0.25	30	3.1	5.2+6	1.7-1	5.1-5	6.1-5	1.8-4	0.0	0.0	0.0	0.0	1.2-5
		2.5	14.5	30		4.2+4	5.9-1	3.9-4	6.8-4	2.0-3	0.0	0.0	0.0	0.0	5.3-5
55	0.0	17.0	0.0	30	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
56	.06	17.0	0.0	30	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
57	0.0	7.0	1.2	30	5.0	3.9+6	9.2-1	1.4-2	1.3-2	1.8-2	4.9-2	7.7-8	3.2-3	5.0-3	3.2-2
		8.3	12.0	30		1.1+6	7.6-2	2.5-2	3.1-2	2.3-1	4.5-1	8.7-7	3.5-2	5.2-2	3.2-1
58	.01	7.3	1.0	30	5.0	0.0	5.1-1	1.9-2	1.7-2	1.1-2	2.3-2	3.2-8	1.4-3	2.2-3	1.5-2
		8.3	12.0	30		2.1+6	4.9-1	3.8-2	4.3-2	1.6-1	3.1-1	5.6-7	2.4-2	3.5-2	2.3-1
59	0.0	5.8	2.50	30	5.0	1.9+6	9.1-1	9.8-3	8.6-3	1.2-2	3.4-2	5.2-8	2.2-3	3.4-3	2.2-2
		8.3	12.0	30		1.1+6	8.8-2	2.5-2	3.1-2	2.2-1	4.2-1	8.1-7	3.2-2	4.8-2	3.0-1
60	0.0	5.5	0.5	30	5.0	4.9+7	3.1-1	9.4-5	1.2-4	3.9-4	0.0	0.0	0.0	0.0	3.8-5
		6.0	14.2	30		4.8+6	6.9-1	3.4-3	6.0-3	2.4-2	1.8-2	6.7-7	1.3-3	1.9-3	1.3-2
61	0.0	7.0	0.0	30	5.0	1.7+9	8.9-1	4.1-5	4.3-5	9.7-5	1.5-6	8.5-5	1.4-6	1.4-6	1.9-6
		7.0	13.2	30		1.0+6	1.1-1	6.7-3	7.6-3	4.3-2	9.6-2	1.7-7	7.3-3	1.1-2	6.8-2
62	0.0	7.0	0.0	30	5.0	1.7+9	8.8-1	2.5-5	2.6-5	1.1-5	1.0-7	0.0	0.0	0.0	5.7-7
		7.0	13.2	30		1.0+6	1.2-1	7.4-3	8.4-3	4.8-2	9.5-2	1.8-7	7.3-3	1.1-2	6.8-2
63	.008	7.0	1.2	30	5.0	3.9+6	9.3-1	1.1-2	9.8-3	1.4-2	4.2-2	4.3-4	2.7-3	4.2-3	2.7-2
		8.3	12.0	30		1.1+6	7.4-2	2.3-2	2.8-2	2.0-1	4.4-1	8.0-7	3.4-2	5.0-2	3.1-1
64	.08	7.0	1.2	30	5.0	3.9+6	9.2-1	1.2-2	1.1-2	1.5-2	4.1-2	6.4-8	2.6-3	4.2-3	2.6-2
		8.3	12.0	30		1.1+6	8.2-2	2.5-2	3.1-2	2.3-1	4.4-1	8.5-7	3.4-2	5.0-2	3.1-1
65	0.0	7.0	1.2	30	5.0	3.9+6	9.2-1	3.5-2	2.9-2	2.3-2	6.6-2	9.0-8	4.0-3	6.3-3	4.2-2
		8.3	12.0	30		5.7+6	8.2-2	7.3-2	8.8-2	3.4-1	7.0-1	1.2-6	5.1-2	7.6-2	5.0-1

Table B-25 (Continued)

PEACH BOTTOM CENTRAL ESTIMATE RELEASE FRACTIONS FOR FOR THE MACCS CONSEQUENCE ESTIMATE

		Rel[2]			Evac.[2]		Release Fraction By Group[3]								
	Cond.[1]	Time	Dur[2]	Elev[2]	Time	Heat	1	2	3	4	5	6	7	8	9
Bin	Prob.	(hr)	(hr)	(m)	(hr)	(cal/s)	Kr-Xe	I	Cs-Rb	Te	Sr	Ru	La	Ce	Ba
66	.02	7.0	1.2	30	5.0	3.9+6	9.2-1	3.5-2	2.9-2	2.3-2	6.6-2	9.0-8	4.0-3	6.3-3	4.2-2
		8.3	12.0	30		5.7+6	8.2-2	7.3-2	8.8-2	3.4-1	7.0-1	1.2-6	5.1-2	7.6-2	5.0-1
67	0.0	5.5	0.25	30	5.0	5.2+6	1.1-1	3.3-5	4.0-5	1.5-4	0.0	0.0	0.0	0.0	1.6-5
		5.8	14.5	30		4.2+4	7.6-1	7.2-4	1.2-3	2.6-3	2.1-6	0.0	0.0	0.0	1.2-4
68	0.0	6.8	0.1	30	5.0	4.7+7	7.6-1	2.5-6	6.5-6	6.3-5	2.2-8	0.0	0.0	0.0	1.2-6
		6.8	13.4	30		9.1+3	6.7-2	1.1-4	1.9-4	2.8-4	3.5-13	0.0	0.0	0.0	4.5-6
69	0.0	5.5	0.25	30	5.0	5.2+6	1.1-1	3.3-5	4.0-5	1.5-4	0.0	0.0	0.0	0.0	1.6-5
		5.8	14.5	30		4.2+4	8.9-1	7.8-4	1.3-3	3.3-3	6.0-4	2.3-8	4.5-5	6.6-5	5.6-4
70	0.0	6.8	0.1	30	5.0	4.7+7	7.6-1	2.5-6	6.5-6	6.3-5	2.2-8	0.0	0.0	0.0	1.2-6
		6.8	13.4	30		9.1+3	2.4-1	1.3-4	2.3-4	7.9-4	3.7-4	1.6-8	3.0-5	4.4-5	2.8-4
71	0.0	10.2	0.1	30	5.0	4.7+7	8.3-1	1.4-7	2.0-7	1.2-5	9.9-6	4.0-10	7.4-7	1.1-6	7.0-6
		10.2	10.1	30		1.2+4	1.7-1	2.3-7	3.1-7	4.8-5	2.0-5	1.3-9	2.3-6	3.1-6	1.9-5
72	.01	10.2	0.1	30	5.0	4.7+7	8.3-1	7.1-7	9.9-7	5.8-5	5.0-5	2.0-9	3.7-6	5.6-6	3.5-5
		10.2	10.1	30		1.2+4	1.7-1	1.2-6	1.6-6	2.4-4	9.9-5	6.6-9	1.2-5	1.6-5	9.4-5
73	0.0	5.5	0.25	30	5.0	5.2+6	1.1-1	3.3-5	4.0-5	1.5-4	0.0	0.0	0.0	0.0	1.6-5
		5.8	14.5	30		4.2+4	6.9-1	3.5-4	5.8-4	2.0-3	2.1-6	0.0	0.0	0.0	9.7-5
74	0.0	6.8	0.1	30	5.0	4.7+7	1.0	1.4-5	2.9-5	1.9-4	2.8-7	0.0	0.0	0.0	5.7-6
75	.02	6.8	0.1	30	5.0	4.7+7	1.0	7.1-5	1.4-4	9.7-4	1.4-6	0.0	0.0	0.0	2.9-5
76	.007	20.3	0.0	30	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
77	.03	20.3	0.0	30	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[1] This is the conditional probability of the bin given core damage.

[2] Release time is the time between shutdown and release, duration is the time during which the release occurs, elevation is the height at which the release occurs, evacuation time is the time (after shutdown) at which evacuation starts.

[3] Values in this and the following tables are written in shorthand notation: 3.0+5 = 3.0 x 10^5

98

BEST COPY AVAILABLE

Table B-26

PEACH BOTTOM CENTRAL ESTIMATE RELEASE FRACTIONS FOR THE CRAC2 CONSEQUENCE ESTIMATE

Bin	Cond. Prob.[1]	Rel[2] Time (hr)	Dur[2] (hr)	Elev[2] (m)	Warn[2] Per. (hr)	Heat (cal/s)	Release Fraction By Group 1 Kr-Xe	2 I	3 Cs-Rb	4 Te	5 Sr	6 Ru	7 La	8 Ce	9 Ba
1	.04	3.1	1.0	30	1.5	9.3+7[3]	1.0	3.5-4	3.2-4	4.7-3	1.4-2	6.1-8	4.8-4	9.5-4	1.0-2
2	.06	16.8	0	30	15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	.006	2.9	1.0	30	1.4	5.8+8	1.0	5.3-3	5.4-3	5.2-2	1.6-1	6.8-7	5.3-3	1.1-2	1.1-1
4	0.0	2.9	1.2	30	1.4	8.4+7	1.0	1.5-2	1.6-2	7.8-2	2.6-1	9.5-7	7.9-3	1.6-2	1.8-1
5	.03	16.8	0	30	15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	0.0	2	1.5	30	0.4	5.6+5	9.6-1	1.1-5	1.3-5	9.9-6	0.0	0.0	0.0	0.0	9.2-8
7	0.0	2	1.8	30	0.4	3.5+5	1.0	1.6-3	1.6-3	1.6-2	4.9-2	2.1-7	1.6-3	3.3-3	3.4-2
8	0.0	3.4	1.0	30	1.8	4.7+7	9.6-1	3.2-4	3.5-4	1.1-3	0.0	0.0	0.0	0.0	3.3-6
9	.02	3.4	1.0	30	1.8	4.7+7	9.6-1	1.6-3	1.8-3	5.6-3	0.0	0.0	0.0	0.0	1.6-5
10	0.0	3.4	1.0	30	1.8	4.7+7	9.1-1	6.0-5	1.1-4	4.8-4	0.0	0.0	0.0	0.0	1.6-6
11	0.0	3.4	1.0	30	1.8	2.4+9	9.1-1	6.6-5	1.3-4	6.5-4	0.0	0.0	0.0	0.0	3.4-6
12	.01	3.4	1.0	30	1.8	2.4+9	1.0	6.8-3	7.0-3	5.7-2	1.6-1	6.8-7	5.3-3	1.1-2	1.1-1
13	0.0	3.4	1.0	30	1.8	1.8+9	1.0	2.0-2	2.0-2	8.6-2	2.6-1	9.5-7	7.9-3	1.6-2	1.8-1
14	.002	2.3	1.2	30	0.7	1.1+6	9.6-1	4.2-3	4.8-3	1.7-2	0.0	0.0	0.0	0.0	1.6-4
15	.001	2.3	1.5	30	0.7	2.9+7	1.0	9.3-3	1.0-2	6.8-2	1.6-1	6.8-7	5.3-3	1.1-2	1.1-1
16	0.0	2.3	1.2	30	0.7	5.4+7	8.4-1	3.2-4	6.2-4	3.8-3	0.0	0.0	0.0	0.0	9.6-5
17	0.0	8.8	1.5	30	7.2	0.0	9.5-1	3.5-5	8.1-8	7.4-3	1.8-4	1.3-8	3.9-4	3.8-4	2.0-3
18	0.0	8.8	1.5	30	7.2	0.0	9.5-1	1.0-4	2.2-7	1.1-2	3.0-4	1.9-8	5.8-4	5.7-4	3.3-3
19	0.0	2.5	3.5	30	0.9	1.5+5	1.0	2.4-2	2.8-2	2.6-1	4.6-1	8.8-7	3.5-2	5.2-2	3.3-1
20	0.0	2.3	1.5	30	0.7	3.7+6	1.0	3.3-3	5.9-3	2.9-2	1.8-2	6.8-7	1.3-3	2.0-3	1.3-2
21	0.0	3.9	1.0	30	2.3	1.3+8	1.0	4.9-3	5.6-3	5.2-2	9.1-2	1.8-7	7.0-3	1.0-2	6.6-2
22	.02	3.9	2.1	30	2.3	3.2+5	1.0	2.4-2	2.8-2	2.6-1	4.6-1	8.8-7	3.5-2	5.2-2	3.3-1
23	0.0	3.9	2.1	30	2.3	3.2+5	1.0	7.1-2	7.9-2	3.9-1	7.3-1	1.2-6	5.3-2	7.9-2	5.3-1
24	0.0	8.9	1.0	30	7.3	6.6+7	1.0	1.1-4	3.3-7	2.0-2	6.9-4	4.1-8	1.2-3	1.2-3	6.5-3
25	0.0	3.9	1.0	30	2.3	1.3+8	9.4-1	1.3-3	3.1-3	4.4-3	1.4-2	1.6-8	6.8-4	1.1-3	6.9-3
26	.03	3.9	1.0	30	2.3	1.3+8	9.4-1	6.7-3	1.6-2	2.2-2	7.2-2	8.2-8	3.4-3	5.4-3	3.4-2
27	0.0	7	1.0	30	5.4	4.7+7	1.0	1.4-6	5.4-8	2.2-4	2.0-5	4.9-9	8.2-6	1.0-5	6.1-5
28	0.0	3.9	1.0	30	2.3	1.3+8	1.0	1.5-3	3.3-3	6.6-3	1.8-2	2.4-8	9.7-4	1.5-3	9.6-3
29	.02	3.9	1.0	30	2.3	1.3+8	1.0	7.5-3	1.6-2	3.3-2	9.0-2	1.2-7	4.9-3	7.6-3	4.8-2
30	0.0	4	2.0	30	2.4	0.0	1.0	5.0-2	5.7-2	2.5-1	4.3-1	7.4-7	3.2-2	4.7-2	3.2-1
31	0.0	10	1.5	30	8.4	0.0	9.1-1	1.8-6	1.1-9	7.1-4	4.9-6	1.1-9	2.7-5	2.2-5	1.1-4
32	.03	10	1.5	30	8.4	0.0	9.1-1	8.8-6	5.7-9	3.5-3	2.5-5	5.3-9	1.3-4	1.1-4	5.7-4
33	.04	10	1.5	30	8.4	0.0	9.1-1	2.6-5	1.6-8	5.2-3	3.9-5	7.5-9	2.0-4	1.7-4	9.1-4
34	0.0	2.5	3.5	30	0.9	1.5+5	1.0	2.1-2	2.5-2	2.4-1	4.6-1	7.5-4	3.5-2	5.2-2	3.3-1
35	0.0	2.5	3.5	30	0.9	1.5+5	1.0	2.4-2	2.8-2	2.6-1	4.6-1	8.8-7	3.5-2	5.2-2	3.3-1
36	0.0	2.5	3.5	30	0.9	7.3+5	1.0	7.3-2	8.1-2	3.9-1	7.3-1	1.2-6	5.3-2	7.9-2	5.3-1
37	0.0	2.3	1.5	30	0.7	3.7+6	1.0	2.7-3	4.8-3	2.7-2	1.8-2	6.8-7	1.3-3	2.0-3	1.3-2
38	0.0	7	1.0	30	5.4	6.6+7	1.0	7.6-6	4.3-7	1.2-3	1.3-4	2.7-8	4.4-5	5.6-5	3.3-4
39	0.0	7	1.0	30	5.4	6.6+7	1.0	3.9-5	2.1-6	5.9-3	6.4-4	1.4-7	2.2-4	2.8-4	1.7-3
40	0.0	3.9	1.0	30	2.3	1.3+8	1.0	4.9-3	5.6-3	5.2-2	9.1-2	1.8-7	7.0-3	1.0-2	6.6-2
41	0.0	3.9	2.1	30	2.3	3.2+5	1.0	2.5-2	2.8-2	2.6-1	4.6-1	8.8-7	3.5-2	5.2-2	3.3-1
42	0.0	3.9	1	30	2.3	1.3+8	9.9-1	4.4-3	5.1-3	4.8-2	9.1-2	6.0-4	7.0-3	1.0-2	6.6-2
43	0.0	3.9	1	30	2.3	1.3+8	1.0	4.8-3	5.6-3	5.2-2	9.1-2	1.8-7	7.0-3	1.0-2	6.6-2

Table B-26 (Continued)

PEACH BOTTOM CENTRAL ESTIMATE RELEASE FRACTIONS FOR THE CRAC2 CONSEQUENCE ESTIMATE

							Release Fraction By Group								
Bin	Cond. Prob.[1]	Rel[2] Time (hr)	Dur[2] (hr)	Elev[2] (m)	Warn[2] Per. (hr)	Heat (cal/s)	1 Kr-Xe	2 I	3 Cs-Rb	4 Te	5 Sr	6 Ru	7 La	8 Ce	9 Ba
44	.03	3.9	1.9	30	2.3	4.1+5	1.0	2.3-2	2.6-2	2.4-1	4.6-1	3.0-3	3.5-2	5.3-2	3.3-1
45	.30	3.9	2.1	30	2.3	3.2+5	1.0	2.4-2	2.8-2	2.6-1	4.6-1	8.8-7	3.5-2	5.2-2	3.3-1
46	0.0	3.9	2.1	30	2.3	3.2+5	1.0	6.4-2	7.0-2	3.5-1	7.3-1	3.7-3	5.3-2	7.9-2	5.3-1
47	0.0	3.9	2.1	30	2.3	3.2+5	1.0	7.0-2	7.8-2	3.9-1	7.3-1	1.2-6	5.3-2	7.9-2	5.3-1
48	.08	3.9	2.1	30	2.3	3.2+5	1.0	7.0-2	7.8-2	3.9-1	7.3-1	1.2-6	5.3-2	7.9-2	5.3-1
49	0.0	10.2	1.0	30	8.6	6.6+7	1.0	4.8-6	3.8-9	1.6-3	1.5-5	2.6-9	6.8-5	5.9-5	3.1-4
50	.03	10.2	1.0	30	8.6	6.6+7	1.0	2.4-5	1.8-8	8.3-3	7.6-5	1.3-8	3.4-4	3.0-4	1.5-3
51	0.0	10.2	1.0	30	8.6	3.3+8	1.0	7.0-5	5.3-8	1.2-2	1.2-4	1.9-8	5.1-4	4.5-4	2.4-3
52	0.0	5.9	1.0	30	4.3	4.7+7	1.0	8.8-6	2.2-6	6.0-4	2.8-4	1.7-8	3.0-5	4.4-5	2.7-4
53	0.0	6.7	1.0	30	5.1	4.7+7	1.0	2.2-6	1.4-7	2.9-4	4.0-5	7.0-9	1.2-5	1.6-5	9.5-5
54	0.0	2.3	1.2	30	0.7	5.2+6	7.6-1	4.4-4	7.4-4	2.2-3	0.0	0.0	0.0	0.0	6.5-5
55	0.0	17	0	30	15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
56	.06	17	0	30	15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
57	0.0	7	2.2	30	3.5	3.9+6	1.0	3.9-2	4.4-2	2.5-1	5.0-1	9.5-7	3.8-2	5.7-2	3.5-1
58	.01	7.3	2.0	30	3.8	0.0	1.0	5.7-2	6.0-2	1.7-1	3.3-1	5.9-7	2.5-2	3.7-2	2.5-1
59	0.0	5.8	3.5	30	2.3	2.0+6	1.0	3.5-2	4.0-2	2.3-1	4.5-1	8.6-7	3.4-2	5.1-2	3.2-1
60	0.0	5.5	1.5	30	2.0	4.9+7	1.0	3.5-2	6.1-3	2.4-2	1.8-2	6.7-7	1.3-3	1.9-3	1.3-2
61	0.0	7	1.0	30	3.5	1.8+9	1.0	6.7-3	7.6-3	4.3-2	9.6-2	8.5-5	7.3-3	1.1-2	6.8-2
62	0.0	7	1.0	30	3.5	1.8+9	1.0	7.4-3	8.4-3	4.8-2	9.5-2	1.8-7	7.3-3	1.1-2	6.8-2
63	.008	7	2.2	30	3.5	3.9+6	1.0	3.4-2	3.8-2	2.1-1	4.8-1	4.3-4	3.7-2	5.4-2	3.4-1
64	.08	7	2.2	30	3.5	3.9+6	1.0	3.7-2	4.2-2	2.5-1	4.8-1	9.1-7	3.7-2	5.4-2	3.4-1
65	0.0	7	2.2	30	3.5	3.9+6	1.0	1.1-1	1.2-1	3.6-1	7.7-1	1.3-6	5.5-2	8.2-2	5.4-1
66	.02	7	2.2	30	3.5	3.9+6	1.0	1.1-1	1.2-1	3.6-1	7.7-1	1.3-6	5.5-2	8.2-2	5.4-1
67	0.0	5.5	1.2	30	2.0	5.2+6	8.7-1	7.5-4	1.2-3	2.7-3	2.1-6	0.0	0.0	0.0	1.4-4
68	0.0	6.8	1.0	30	3.3	4.7+7	8.3-1	1.1-4	2.0-4	3.4-4	2.2-8	0.0	0.0	0.0	5.7-6
69	0.0	5.5	1.2	30	2.0	5.2+6	1.0	8.1-4	1.3-3	3.4-3	6.0-4	2.3-8	4.5-5	6.6-5	5.8-4
70	0.0	6.8	1.0	30	3.3	4.7+7	1.0	1.3-4	2.4-4	8.5-4	3.7-4	1.6-8	3.0-5	4.4-5	2.8-4
71	0.0	10.2	1.0	30	6.7	4.7+7	1.0	3.7-7	5.1-7	6.0-5	3.0-5	1.7-9	3.0-6	4.2-6	2.6-5
72	.01	10.2	1.0	30	6.7	4.7+7	1.0	1.9-6	2.6-6	3.0-4	1.5-4	8.6-9	1.6-5	2.2-5	1.3-4
73	0.0	5.5	1.2	30	2.0	5.2+6	8.0-1	3.8-4	6.2-4	2.2-3	2.1-6	0.0	0.0	0.0	1.1-4
74	0.0	6.8	0.01	30	3.3	4.7+7	1.0	1.4-5	2.9-5	1.9-4	2.8-7	0.0	0.0	0.0	5.7-6
75	.02	6.8	0.01	30	3.3	4.77	1.0	7.1-5	1.4-4	9.7-4	1.4-6	0.0	0.0	0.0	2.9-5
76	.007	20.3	0.0	30	16.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
77	.03	20.3	0.0	30	16.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

---

[1] This is the conditional probability of the bin given core damage.

[2] Release time is the time between shutdown and release, duration is the time during which the release occurs, elevation is the height of the release, warning period is the time between notification and the release.

[3] Values in this and the following tables are written in shorthand notation: 9.3+7 = 9.3×10^7

100

BEST COPY AVAILABLE

Table B-27
PEACH BOTTOM CLUSTER RELEASE FRACTIONS FOR MACCS

							Release Fraction By Group[3]								
Bin	Usage[1] Fac.	Rel[2] Time (hr)	Dur[2] (hr)	Elev[2] (m)	Evac.[2] Time (hr)	Heat (cal/s)	1 Kr-Xe	2 I	3 Cs-Rb	4 Te	5 Sr	6 Ru	7 La	8 Ce	9 Ba
1	.01	6.8	0.5	30	3.1	0.0	7.7-2[3]	7.3-5	8.0-14	1.1-5	6.2-5	1.7-11	2.6-8	3.2-8	4.9-6
		7.3	9.5	30		6.5+4	5.7-1	7.5-4	4.9-14	1.9-5	1.3-4	5.6-12	8.5-9	9.2-9	2.9-6
2	.05	6	.01	30	3.1	4.7+7	8.4-1	1.4-5	8.7-6	2.7-4	3.3-4	1.9-9	2.9-6	4.7-6	1.8-4
		6	11	30		1.1+4	1.6-1	9.0-3	1.1-5	7.5-4	1.1-3	1.6-9	2.4-6	3.7-6	2.2-4
3	.10	6.7	.01	30	3.1	6.5+7	8.7-1	2.0-4	1.4-4	1.5-4	7.0-6	1.3-8	1.3-7	1.4-7	1.2-5
		6.7	11	30		1.6+5	1.3-1	4.4-2	3.6-3	3.1-3	7.3-6	3.5-8	3.3-7	2.8-7	2.4-5
4	.11	13	.01	30	5	9.8+9	1.0	9.0-3	1.7-4	1.6-2	4.8-3	2.4-7	3.1-4	4.6-4	8.0-3
		13	7.4	30		3.4+6	2.7-4	9.4-3	6.6-5	3.2-2	2.9-3	3.5-7	4.1-4	5.0-4	8.2-3
5	.11	5.5	.05	30	5	9.3+6	3.8-1	4.4-4	1.7-5	3.4-6	7.9-8	0.0	0.0	0.0	1.7-6
		6	14	30		9.7+5	6.2-1	4.1-2	8.2-3	6.1-2	2.9-2	2.9-6	1.7-3	1.7-3	1.4-2
6	.07	7	0.01[4]	30	5	3.9+9	9.0-1	4.7-4	2.0-4	4.4-4	6.3-6	3.1-4	6.3-6	6.3-6	8.4-6
		7	13	30		9.3+3	9.9-2	1.7-1	6.5-2	8.8-2	2.3-2	2.0-6	1.3-3	1.3-3	1.2-2
7	.08	7	0.01	30	5	1.7+9	9.2-1	2.3-6	6.3-6	1.1-5	3.3-7	1.4-5	2.9-7	2.9-7	7.2-7
		7	13	30		5.2+6	8.4-2	1.4-1	1.2-1	2.0-1	8.6-2	2.3-3	5.2-3	5.2-3	4.2-2
8	.06	5.5	.75	30	5	3.3+7	6.5-1	2.9-2	5.5-2	1.1-2	2.5-4	0.0	0.0	0.0	5.2-3
		6.3	14	30		4.9+6	3.5-1	2.3-2	6.9-2	1.9-1	3.5-1	4.7-6	7.2-3	1.3-2	2.4-1
9	.06	7	0.0	30	5	8.7+9	1.0	3.7-2	5.6-2	4.0-2	1.1-3	4.1-2	8.2-4	8.2-4	5.2-3
		7	13	30		5.2+6	0.0	1.5-2	8.1-2	3.7-1	6.9-1	9.0-6	1.4-2	2.7-2	4.6-1
10	.003	3.1	0.0	30	3.1	9.3+7	4.5-1	4.2-6	4.0-6	3.6-7	0.0	0.0	0.0	0.0	4.0-9
11	0.0	3.4	.84	30	3.1	2.6+7	1.1-1	9.7-6	1.0-4	5.6-5	2.1-5	2.6-9	1.5-6	1.6-6	1.3-5
		4.3	13	30		8.0+5	8.2-1	5.9-4	1.1-4	9.8-4	3.0-4	2.9-8	1.8-5	1.8-5	1.6-4
12	.02	2.5	.25	30	3.1	0.0	2.5-1	2.8-3	4.1-5	7.7-6	1.8-7	0.0	0.0	0.0	3.2-6
		2.8	14	30		2.5+6	3.9-1	5.7-3	6.1-5	1.2-5	3.1-7	0.0	0.0	0.0	5.2-6
13	.0009	3.4	.84	30	3.1	2.6+7	1.0-1	1.1-4	1.4-4	7.7-5	2.1-4	3.5-9	5.4-6	1.0-5	1.8-4
		4.3	13	30		8.0+5	8.1-1	2.8-4	1.5-4	1.4-3	3.0-3	4.1-8	6.2-5	1.1-4	2.2-3
14	.0005	3.6	.71	30	3.1	7.3+5	8.5-1	8.1-4	6.7-4	5.3-4	2.2-4	6.6-6	1.6-5	1.7-5	1.3-4
		4.3	12	30		2.0+4	1.5-1	8.5-2	5.0-4	5.3-3	1.8-3	1.7-7	1.1-4	1.1-4	9.7-4
15	.003	2	.46	30	3.1	0.0	1.9-1	4.5-3	3.8-3	7.1-4	1.6-5	0.0	0.0	0.0	3.0-4
		2.5	14	30		2.5+6	4.1-1	1.2-2	8.3-3	1.6-3	3.9-5	0.0	0.0	0.0	6.8-4
16	.0009	2.5	.25	30	3.1	0.0	1.3-1	8.6-2	3.4-4	8.5-6	0.0	0.0	0.0	0.0	4.8-7
		2.8	.14	30		2.5+6	1.9-1	1.3-1	5.1-4	1.4-5	0.0	0.0	0.0	0.0	9.2-7
17	.0005	2.3	.21	30	3.1	1.2+6	9.8-2	1.6-7	6.2-8	1.3-8	1.5-11	0.0	0.0	0.0	1.1-9
		2.5	14	30		8.6+3	7.9-1	1.4-3	1.2-5	4.4-6	2.3-8	0.0	0.0	0.0	6.4-8
18	.003	2.5	.25	30	3.1	0.0	1.3-1	3.0-4	1.2-6	8.0-8	0.0	0.0	0.0	0.0	1.2-8
		2.8	.14	30		4.4+4	7.6-1	1.7-3	8.9-4	1.5-4	2.4-3	5.6-6	5.0-5	9.4-5	1.8-3
19	.007	2	.46	30	3.1	0.0	1.9-1	6.0-4	5.0-4	9.3-5	2.1-6	0.0	0.0	0.0	3.8-5
		2.5	14	30		4.3+4	7.8-1	8.8-4	9.0-5	5.1-4	4.3-4	7.2-6	2.6-5	2.6-5	2.3-4
20	.02	3.1	0.01	30	3.1	9.3+7	7.8-1	6.4-6	7.3-6	2.7-6	1.4-8	0.0	0.0	0.0	3.9-8
		3.1	14	30		9.0+3	2.2-1	1.1-3	7.9-4	3.8-3	1.2-3	1.2-7	7.2-5	7.1-5	6.4-4
21	.006	3.1	.01	30	3.1	4.7+7	4.5-1	2.3-5	1.4-7	2.2-8	0.0	0.0	0.0	0.0	1.6-9
		3.1	14	30		9.0+3	5.5-1	2.8-2	1.1-2	1.8-2	3.6-3	3.5-7	2.1-4	2.1-4	2.0-3
22	.03	3.1	0.01	30	3.1	9.3+7	7.9-1	7.5-6	7.2-6	2.6-6	1.4-8	0.0	0.0	0.0	4.1-8
		3.1	14	30		4.5+4	2.1-1	7.7-3	2.4-3	1.1-2	3.6-3	3.5-7	2.1-4	2.1-4	1.9-9

Table B-27 (Continued)

PEACH BOTTOM CLUSTER RELEASE FRACTIONS FOR MACCS

Bin	Usage[1] Fac.	Rel[2] Time (hr)	Dur[2] (hr)	Elev[2] (m)	Evac.[2] Time (hr)	Heat (cal/s)	Release Fraction By Group[3] 1 Kr-Xe	2 I	3 Cs-Rb	4 Te	5 Sr	6 Ru	7 La	8 Ce	9 Ba
23	.006	3.1	0.01	30	3.1	2.3+8	4.6-1	3.3-5	7.2-7	5.6-8	0.0	0.0	0.0	0.0	8.2-9
		3.1	14	30		4.5+4	5.4-1	3.3-2	1.1-2	1.8-2	2.6-2	3.5-7	5.4-4	1.0-3	2.0-2
24	.04	3.4	0.01	30	3.1	4.7+7	7.9-1	4.5-5	8.2-8	5.3-8	4.1-19	0.0	0.0	0.0	4.6-9
		3.4	14	30		9.0+3	2.1-1	5.4-2	1.8-3	8.1-3	8.6-3	4.0-4	7.8-4	1.4-4	6.4-3
25	.0001	3.1	0.01	30	3.1	9.3+7	5.5-1	4.2-2	4.2-2	7.8-2	8.2-4	4.1-2	8.2-4	8.2-4	9.8-4
		3.1	14	30		9.0+3	0.0	4.4-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	.0006	3.1	0.01	30	3.1	1.2+9	5.0-1	7.5-6	8.2-6	6.8-7	0.0	0.0	0.0	0.0	6.0-10
		3.1	14	30		9.2+5	5.0-1	1.4-1	7.5-2	7.2-2	1.5-2	1.5-6	9.1-4	9.1-4	8.2-3
27	.0008	2.5	2.3	30	3.1	1.6+5	6.1-1	2.2-2	4.3-2	1.1-2	1.7-2	8.6-4	9.2-4	1.8-4	8.1-3
		4.8	12	30		1.3+5	3.9-1	1.7-1	1.6-1	2.3-1	1.9-1	1.3-2	1.8-2	3.3-3	1.5-1
28	.02	3.1	0.01	30	3.1	1.2+9	8.9-1	1.4-5	1.5-5	5.3-6	2.3-20	0.0	0.0	0.0	7.0-8
		3.1	14	30		9.2+5	1.1-1	1.2-1	1.7-2	4.8-2	1.6-2	1.5-6	9.4-4	9.4-4	8.2-3
29	.008	2.3	.25	30	3.1	0.0	1.5-1	1.5-2	6.5-4	2.7-4	1.4-4	3.2-5	2.3-6	2.3-6	1.4-4
		2.5	14	30		2.5+6	8.1-1	1.0-1	2.3-3	2.0-3	7.4-3	1.3-4	2.5-4	4.6-4	5.1-3
30	.001	2.3	.75	30	3.1	4.9+5	6.5-1	3.0-6	2.0-6	4.7-7	3.9-10	0.0	0.0	0.0	2.6-8
		3	14	30		1.1+5	3.5-1	2.0-1	1.9-1	1.5-1	2.9-2	2.2-4	1.8-3	1.8-3	1.5-2
31	.005	3.1	0.01	30	3.1	5.8+8	9.2-1	1.1-4	3.2-6	1.8-6	2.9-8	0.0	0.0	0.0	8.2-7
		3.1	14	30		9.1+5	8.5-1	1.2-1	2.2-4	1.6-2	9.6-2	1.3-6	2.0-3	3.7-3	6.5-2
32	.0002	2.3	2.5	30	3.1	1.5+5	9.0-1	1.5-2	2.2-2	9.5-3	3.3-2	2.7-7	4.2-4	8.3-4	1.6-2
		4.8	12	30		1.3+5	9.7-2	1.5-1	1.0-1	2.0-1	3.9-1	5.5-6	8.3-3	1.6-2	2.9-1
33	.003	3.1	0.01	30	3.1	1.2+9	1.0	1.1-3	2.6-4	5.0-3	2.0-4	1.0-2	2.0-4	2.0-4	1.9-4
		3.1	14	30		4.6+6	0.0	3.3-2	1.5-7	5.1-2	4.7-2	4.4-6	2.8-3	2.8-3	2.3-2
34	.003	3.4	.65	30	3.1	1.0+8	8.8-1	6.5-3	7.0-3	5.3-3	2.2-3	3.7-8	5.6-5	1.1-4	1.9-3
		4	13	30		6.7+6	1.2-1	4.0-2	3.9-2	1.2-1	2.9-1	3.9-6	5.9-3	1.1-2	/.21
35	0.0	3.4	1.2	30	3.1	5.8+7	9.2-1	7.3-2	8.4-2	4.5-2	6.4-1	1.1-6	1.6-3	3.0-3	5.3-2
		4.5	13	30		7.0+6	7.6-2	3.8-1	3.4-1	3.9-1	5.8-1	7.6-6	1.1-2	2.1-2	4.1-1
36	.002	2.3	.55	30	3.1	3.3+6	8.7-1	1.0-2	5.6-3	3.5-3	2.6-5	0.0	0.0	0.0	1.2-4
		2.8	14	30		5.6+5	1.3-1	1.1-1	6.2-2	9.0-2	1.3-1	8.9-3	1.1-2	2.1-3	8.5-2
37	.003	2.3	.25	30	3.1	5.2+6	2.6-1	1.8-2	2.3-4	9.3-5	1.1-6	0.0	0.0	0.0	2.8-5
		2.5	15	30		4.2+4	7.4-1	1.7-1	1.2-2	2.4-2	2.6-2	3.5-7	5.4-4	1.0-3	1.8-2
38	.0002	3.1	.87	30	3.1	3.7+6	9.2-1	2.5-2	3.1-2	2.5-2	3.5-2	5.8-7	8.8-4	1.7-3	2.9-2
		4	13	30		9.8+5	8.3-2	1.7-1	1.1-1	3.0-1	4.3-1	5.7-6	8.6-3	1.6-2	3.1-1
39	.0008	2.3	.88	30	3.1	0.0	6.4-1	3.5-2	6.7-3	2.7-3	3.2-5	0.0	0.0	0.0	5.6-4
		3.1	14	30		6.4+6	3.5-1	2.8-1	1.6-1	1.6-1	1.6-1	7.9-3	2.9-3	5.3-3	9.2-2
40	0.0	2.8	1.3	30	3.1	1.1+7	9.1-1	5.7-2	7.0-2	3.4-2	4.1-2	6.9-7	1.0-3	2.0-3	1.3-1
		4	13	30		6.9+6	8.8-2	4.7-1	5.0-1	4.7-1	6.3-1	8.4-6	1.3-2	2.4-2	4.5-1
41	.002	2.3	.89	30	3.1	3.0+7	9.0-1	1.2-2	4.2-3	2.1-2	3.3-4	1.7-2	3.3-4	3.3-4	3.3-4
		3.1	14	30		2.6+6	9.9-2	1.6-1	7.0-2	1.0-1	3.0-2	2.9-6	1.8-3	1.8-3	1.6-2
42	.003	3.4	0.0	30	3.1	4.8+9	8.9-1	3.1-1	3.8-3	1.3-3	8.1-7	0.0	0.0	0.0	6.4-5
		3.4	14	30		1.3+6	1.1-1	8.2-2	3.4-3	9.6-3	3.1-3	3.1-7	1.9-4	1.9-4	1.6-3
43	.0004	2.3	.5	30	3.1	0.0	3.8-1	4.3-2	3.0-4	1.2-4	1.3-6	0.0	0.0	0.0	2.4-5
		2.8	14	30		6.3+6	6.1-1	1.5-1	6.5-2	8.2-2	1.7-1	8.3-3	3.0-3	5.5-3	9.5-2

Table B-27 (Continued)

PEACH BOTTOM CLUSTER RELEASE FRACTIONS FOR MACCS

							Release Fraction By Group[3]								
Bin	Usage[1] Fac.	Rel[2] Time (hr)	Dur[2] (hr)	Elev[2] (m)	Evac.[2] Time (hr)	Heat (cal/s)	1 Kr-Xe	2 I	3 Cs-Rb	4 Te	5 Sr	6 Ru	7 La	8 Ce	9 Ba
44	.0001	2.3	2.0	30	3.1	9.1+5	8.9-1	9.9-2	1.2-2	4.4-3	5.0-1	4.1-8	6.4-5	1.3-4	2.5-3
		4.3	13	30		6.3+5	1.1-1	1.3-1	1.1-1	3.1-1	6.3-1	8.6-6	1.3-2	2.4-2	4.6-1
45	.0008	2.5	.25	30	3.1	0.0	1.3-1	8.6-2	3.4-4	8.5-6	0.0	0.0	0.0	0.0	4.8-7
		2.8	14	30		6.3+6	7.6-1	2.7-1	2.8-2	3.8-2	5.7-2	2.0-3	1.1-3	1.9-3	3.8+1
46	.0003	2.3	.75	30	3.1	2.4+6	3.9-1	1.3-1	1.6-3	9.4-5	0.0	0.0	0.0	0.0	2.7-6
		3	14	30		5.7+5	6.1-1	5.1-1	4.3-1	4.2-1	8.7-2	8.7-6	5.3-3	5.3-3	4.7-2
47	.001	2.3	.88	30	3.1	3.0+7	1.0	5.9-2	8.4-3	2.0-2	7.1-4	3.3-2	6.7-4	6.7-4	1.3-3
		3.1	14	30		2.6+6	3.6-7	1.9-1	8.9-8	3.3-2	2.2-1	2.8-6	4.5-3	8.5-3	1.5-1
48	.0009	2	.46	30	3.1	0.0	1.7-1	1.1-1	3.4-3	3.6-4	8.2-7	0.0	0.0	0.0	5.9-5
		2.5	14	30		2.5+6	8.0-1	4.8-1	1.8-2	3.3-2	7.4-2	8.9-7	1.3-3	2.5-3	4.9-2
49	0.0	2.3	.88	30	3.1	1.5+7	3.2-1	1.1-1	2.0-4	1.1-5	0.0	0.0	0.0	0.0	3.2-7
		3.1	14	30		6.4+6	6.8-1	5.0-1	4.0-1	4.0-1	8.9-2	1.0-2	5.6-3	5.6-3	4.8-2
50	.0009	3.4	.01	30	3.1	1.2+10	7.8-1	5.2-1	2.1-3	4.0-4	5.4-7	0.0	0.0	0.0	3.8-5
		3.4	14	30		6.4+6	2.2-1	1.1-1	3.5-2	8.4-2	1.3-1	1.7-6	2.6-3	4.9-3	9.3-2
51	.0001	2	.46	30	3.1	0.0	1.7-1	1.1-1	3.4-3	3.6-4	8.2-7	0.0	0.0	0.0	5.9-5
		2.5	14	30		2.5+6	8.3-1	5.3-1	8.3-2	1.7-1	1.9-1	2.1-6	3.2-3	6.0-3	1.2-1
52	.0001	3.4	0.01	30	3.1	2.4+10	8.9-1	6.0-1	2.2-2	1.2-2	3.0-6	0.0	0.0	0.0	3.2-4
		3.4	14	30		6.4+6	1.1-1	6.1-2	4.9-2	1.4-1	3.3-1	4.5-6	6.8-3	1.3-2	2.4-1
53	0.0	3.4	0.01	30	3.1	2.4+10	8.9-1	6.0-1	2.2-2	1.2-2	3.0-6	0.0	0.0	0.0	3.2-4
		3.4	14	30		6.4+6	1.1-1	1.3-1	1.8-1	4.4-1	6.8-1	9.2-6	1.4-2	2.6-2	4.9-1
54	.15	–	–	–	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

---

[1] This is the the frequency of usage for each cluster, given core damage.

[2] Release time is the time between shutdown and release, duration is the time during which the release occurs, evacuation time is the time at which evacuation starts.

[3] Values in this table are written in shorthand notation: 2.7+6 = 2.7 x 10^6

[4] Some of the durations in the release are very small, on the order of a minute. The RELTRAC code includes a step at vessel breach which includes an instantaneous relocation of the radionuclides. For some calculations the duration was based on this part of the code with the result that the puff release is assigned a duration that is artificially short. This could result in some underprediction of early effects since the short, high-energy release results in more loft into the atmosphere. This calculational difficulty will be resolved before final publication of these results.

Table B-28

PEACH BOTTOM CLUSTER RELEASE FRACTIONS FOR CRAC2

		Rel^2			Warn^2		Release Fraction By Group								
Bin	Usage Fac.^{1}	Time (hr)	Dur^2 (hr)	Elev^2 (m)	Per. (hr)	Heat (cal/s)	1 Kr-Xe	2 I	3 Cs-Rb	4 Te	5 Sr	6 Ru	7 La	8 Ce	9 Ba
1	.01	6.8	1.5	30	5.2	0.0	6.5-1	8.2-4	1.3-13	3.0-5	1.9-4	2.3-11	3.5-8	4.1-8	7.8-6
2	.05	6	1.0	30	4.4	4.7+7	1.0	9.0-3	2.0-5	1.0-3	1.4-3	3.5-9	5.3-6	8.4-6	4.0-4
3	.10	6.7	1.0	30	5.1	6.6+7	1.0	4.4-2	3.7-3	3.3-3	1.4-5	4.8-8	4.6-7	4.2-7	3.6-5
4	.11	2.9	1.0	30	9.4	9.8+9	1.0	1.8-2	2.4-4	4.8-2	7.7-3	5.9-7	7.2-4	9.6-4	1.6-2
5	.11	5.5	1.5	30	2	9.8+6	1.0	4.1-2	8.2-3	6.1-2	2.9-2	2.9-6	1.7-3	1.7-3	1.4-2
6	.07	7	1.0	30	3.5	3.9+9	1.0	1.7-1	6.5-2	8.8-2	2.3-2	3.1-4	1.3-3	1.3-3	1.2-2
7	.08	7	1.0	30	3.5	1.8+9	1.0	1.4-1	1.2-2	2.0-1	8.6-2	2.3-3	5.2-3	5.2-3	4.2-2
8	.06	5.5	1.8	30	2	3.3+7	1.0	5.2-2	1.2-2	2.0-1	3.5-1	4.7-6	7.2-3	1.3-2	2.5-1
9	.06	7	1.0	30	3.5	8.8+9	1.0	5.2-2	1.4-2	4.1-1	6.9-1	4.1-2	1.5-2	2.8-2	4.7-1
10	.003	3.1	0.01	30	1.5	9.3+7	4.5-1	4.2-6	4.0-6	3.6-7	0.0	0.0	0.0	0.0	4.0-9
11	0.0	3.4	1.8	30	1.8	2.6+7	9.3-1	6.9-4	2.1-4	1.0-3	3.2-4	3.2-8	1.9-5	2.0-5	1.7-4
12	.02	2.5	1.3	30	0.9	0.0	6.4-1	8.5-3	1.0-4	2.0-5	4.9-7	0.0	0.0	0.0	8.4-6
13	.0009	3.4	3.4	30	1.8	2.6+7	9.1-1	3.9-4	2.9-4	1.5-3	3.2-3	4.4-8	6.7-5	1.2-4	2.4-3
14	.0005	3.6	3.6	30	2	7.3+5	1.0	8.6-2	1.2-3	5.8-3	2.0-3	6.8-6	1.3-4	1.3-4	1.1-3
15	.003	2	2.0	30	0.4	0.0	6.0-1	1.6-2	1.2-2	2.3-3	5.5-5	0.0	0.0	0.0	9.8-4
16	.0009	2.5	2.5	30	0.9	0.0	3.2-1	2.2-2	8.5-4	2.3-5	0.0	0.0	0.0	0.0	1.4-6
17	.0005	2.3	2.3	30	0.7	1.2+6	8.9-1	1.4-3	1.2-5	4.4-6	2.3-8	0.0	0.0	0.0	6.5-8
18	.003	2.5	2.5	30	0.9	0.0	8.9-1	2.0-3	8.9-4	1.5-3	2.4-3	5.6-6	5.0-5	9.4-5	1.8-3
19	.007	2	2.0	30	0.4	0.0	9.7-1	1.5-3	5.9-4	6.0-4	4.3-4	7.2-6	2.6-5	2.6-5	2.7-4
20	.02	3.1	3.1	30	1.5	9.3+7	1.0	1.1-3	8.0-4	3.8-3	1.2-3	1.2-7	7.2-5	7.1-5	6.4-4
21	.006	3.1	3.1	30	1.5	4.7+7	1.0	2.8-2	1.1-2	1.8-2	3.6-3	3.5-7	2.1-4	2.1-4	2.0-3
22	.03	3.1	3.1	30	1.5	9.3+7	1.0	7.7-3	2.4-3	1.1-2	3.6-3	3.5-7	2.1-4	2.1-4	1.9-3
23	.006	3.1	3.1	30	1.5	2.3+8	1.0	3.3-2	1.1-2	1.8-2	2.6-2	3.5-7	5.4-4	1.0-3	2.0-2
24	.04	3.4	3.4	30	1.8	4.7+7	1.0	5.4-2	1.8-3	8.1-3	8.6-3	6.0-4	7.8-4	1.4-4	6.4-3
25	.0001	3.1	3.1	30	1.5	9.3+7	5.5-1	4.3-2	4.2-2	7.8-2	8.2-4	4.1-2	8.2-4	8.2-4	8.2-4
26	.0006	3.1	3.1	30	1.5	1.2+9	1.0	1.4-1	7.5-2	7.2-2	1.5-2	1.5-6	9.1-4	9.1-4	8.2-3
27	.0008	2.5	2.5	30	0.9	1.6+5	1.0	1.9-1	2.0-1	2.4-1	2.1-1	1.4-2	1.9-2	3.5-3	1.6-1
28	.02	3.1	3.1	30	1.5	1.2+9	1.0	1.2-1	1.7-2	4.8-2	1.6-2	1.5-6	9.4-4	9.4-4	8.3-3
29	.008	2.3	2.3	30	0.7	0.0	9.6-1	1.2-1	3.0-3	2.3-3	7.5-3	1.6-4	2.5-4	4.6-4	5.2-3
30	.001	2.3	2.3	30	0.7	4.9+5	1.0	2.0-1	1.9-1	1.5-1	2.9-2	2.2-4	1.8-3	1.8-3	1.5-2
31	.005	3.1	3.1	30	1.5	5.8+8	1.0	1.2-1	2.2-4	1.6-2	9.6-2	1.3-6	2.0-3	3.7-3	6.5-2
32	.0002	2.3	2.3	30	0.7	1.5+5	1.0	1.7-1	1.2-1	2.1-1	4.2-1	5.8-6	8.7-3	1.7-2	3.1-1
33	.003	3.1	3.1	30	1.5	1.2+9	1.0	3.4-2	2.6-4	5.6-2	4.7-2	1.0-2	3.0-3	3.0-3	2.3-2
34	.003	3.4	3.4	30	1.8	1.0+8	1.0	4.7-2	4.6-2	1.3-1	2.9-1	3.9-6	6.0-3	1.1-2	2.1-1
35	0.0	3.4	3.4	30	1.8	5.8+7	1.0	4.5-1	4.2-1	4.4-1	6.4-1	8.7-6	1.3-2	2.4-2	4.6-1
36	.002	2.3	2.3	30	0.7	3.3+6	1.0	1.2-1	6.9-2	9.4-2	1.3-1	8.9-3	1.1-2	2.1-3	8.5-2
37	.003	2.3	2.3	30	0.7	5.2+6	1.0	1.9-1	1.2-2	2.4-2	2.6-2	3.5-7	5.4-4	1.0-3	1.8-2
38	.0002	3.1	3.1	30	1.5	3.7+6	1.0	1.9-1	1.4-1	3.2-1	4.7-1	6.3-6	9.5-3	1.8-2	3.4-1
39	.0008	2.3	2.3	30	0.7	0.0	9.9-1	3.1-1	1.7-1	1.6-1	1.6-1	7.9-3	2.9-3	5.3-3	9.3-2
40	0.0	2.8	2.8	30	1.2	1.1+7	1.0	5.3-1	5.7-1	5.0-1	6.7-1	9.1-6	1.4-2	2.6-2	4.8-1

Table B-28 (Continued)

PEACH BOTTOM CLUSTER RELEASE FRACTIONS FOR CRAC2

Bin	Usage Fac.[1]	Rel[2] Time (hr)	Dur[2] (hr)	Elev[2] (m)	Warn[2] Per. (hr)	Heat (cal/s)	Release Fraction By Group 1 Kr-Xe	2 I	3 Cs-Rb	4 Te	5 Sr	6 Ru	7 La	8 Ce	9 Ba
41	.002	2.3	2.3	30	0.7	3.0+7	1.0	1.7-1	7.4-2	1.2-1	3.0-2	1.7-2	2.1-3	2.1-3	1.6-2
42	.003	3.4	3.4	30	1.8	4.8+9	1.0	3.9-1	7.2-3	1.1-2	3.1-2	3.1-7	1.9-4	1.9-4	1.7-3
43	.0004	2.3	2.3	30	0.7	0.0	9.9-1	1.9-1	6.5-2	8.2-2	1.7-1	8.3-3	3.0-3	5.5-3	9.5-2
44	.0001	2.3	2.3	30	0.7	9.1+5	1.0	2.3-1	1.2-1	3.1-1	6.3-1	8.6-6	1.3-2	2.4-2	4.6-1
45	.0008	2.5	2.5	30	0.9	0.0	8.9-1	3.6-1	2.8-2	3.8-2	5.7-2	2.0-3	1.1-3	1.9-3	3.8-2
46	.0003	2.3	2.3	30	0.7	2.4+6	1.0	6.4-1	4.3-1	4.2-1	8.7-2	8.7-6	5.3-3	5.3-3	4.7-2
47	.001	2.3	2.3	30	0.7	3.0+7	1.0	2.5-1	8.4-3	5.3-2	2.2-1	3.3-2	5.2-3	9.2-3	1.5-1
48	.0009	2	2	30	0.4	0.0	9.6-1	5.9-1	2.1-2	3.3-2	7.4-2	8.9-7	1.3-3	2.5-3	4.9-2
49	0.0	2.3	2.3	30	0.7	1.5+7	1.0	6.1-1	4.0-1	4.0-1	8.9-2	1.0-2	5.6-3	5.6-3	4.8-2
50	.0009	3.4	3.4	30	1.8	1.2+10	1.0	6.3-1	3.7-2	8.4-2	1.3-1	1.7-6	2.6-3	4.9-3	9.3-2
51	.0001	2	2	30	0.4	0.0	1.0	6.4-1	8.6-2	1.7-1	1.9-1	2.1-6	3.2-3	6.0-3	1.2-1
52	.0001	3.4	3.4	30	1.8	2.4+10	1.0	6.6-1	7.1-2	1.5-1	3.3-1	4.5-6	6.8-3	1.3-2	2.4-1
53	0.0	3.4	3.4	30	1.8	2.4+10	1.0	7.3-1	2.0-1	4.5-1	6.8-1	2.2-6	1.4-2	2.6-2	4.9-1
54	.15	–	–	–	–	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

---

[1] This is the frequency of usage of each cluster, given core damage.

[2] Release time is the time between shutdown and release, duration is the time during which the release occurs, elevation is the height of the release, warning period is the time between notification and the release.

[3] Values in this and the following tables are written in shorthand notation: 9.3+7 = 9.3 x 10^7

B.5 RESULTS OF THE CONSEQUENCE ANALYSIS

The estimated offsite consequences resulting from each of the source terms provided in the previous section are listed in this section. Section 5 of the main report includes all of the MACCS and CRAC2 results for each LLH cluster source terms as well as for the central estimate bins with significant contribution to risk. A complete listing of all of the consequences is provided here.

B.5.1 Central Estimate Consequence Results

The consequence estimates for all 77 accident-progression bins is provided in this section. The results are listed by bin number. Table B-24 in the previous section provides a cross reference for bin numbers to bin definitions. The insights derived from the consequences analysis are provided in Section 5.4 and 5.5 of the main report. The consequences estimated with the MACCS code are listed in Table B-29 followed by the CRAC2 estimates in Table B-30.

B.5.2 LLH Consequence Estimates

The MACCS and CRAC2 estimates of consequences for the 54 clustered source terms that provide the basis for the LLH estimates of risk are provided in the main report and are repeated here for convenience. The MACCS estimates are listed first in Table B-31; the CRAC2 estimates are indicated in Table B-32.

106

Table B-29

MACCS ESTIMATES OF MEAN CONSEQUENCES FOR CENTRAL-ESTIMATE BINS

Bin	Early Fatalities	Early Injuries	Individual Risk (Conditional) (0-1 Miles)	Latent Cancer Fatalities	Population Dose--50 Miles (Person-Rem)	Offsite Costs ($)
1	2.4-3[1]	3.6-2	3.1-5	3.2+2	3.1+6	1.2+8
2	0.0	0.0	0.0	0.0	0.0	0.0
3	2.3-1	1.3	1.1-3	2.7+3	1.2+7	2.8+9
4	1.1-1	1.5	4.6-4	4.5+3	1.6+7	5.0+9
5	0.0	0.0	0.0	0.0	0.0	0.0
6	1.4-3	5.7-2	1.9-5	6.6	2.6+4	4.9+5
7	1.2-1	7.3-1	9.0-4	8.5+2	5.9+6	5.3+8
8	0.0	2.6-3	0.0	5.3+1	1.6+5	6.0+6
9	4.3-6	6.3-3	6.6-8	1.9+2	4.4+5	2.9+7
10	0.0	1.5-3	0.0	2.1+1	7.0+4	1.6+6
11	0.0	0.0	0.0	3.0+1	8.7+4	1.8+6
12	2.2-1	1.1	1.1-3	2.8+3	1.2+7	2.8+9
13	6.8-2	1.2	4.0-4	4.8+3	1.6+7	4.9+9
14	7.6-3	1.4-1	9.7-5	4.0+2	9.1+5	6.7+7
15	2.8-1	1.7	1.2-3	2.9+3	1.2+7	2.8+9
16	1.3-4	1.4-2	1.9-6	1.2+2	2.7+5	1.1+7
17	6.4-5	4.2-3	9.9-7	7.5+1	4.1+5	2.6+7
18	1.1-4	5.9-3	1.7-6	1.2+2	6.5+5	4.7+7
19	6.5	3.1+1	5.3-3	6.1+3	2.0+7	1.1+10
20	1.3-2	2.4-1	1.2-4	8.8+2	4.9+6	3.9+8
21	5.2-1	1.8	2.2-3	1.9+3	9.2+6	1.8+9
22	5.9	1.5+1	4.9-3	6.0+3	2.0+7	1.1+10
23	1.7+1	1.2+2	4.2-3	9.7+3	2.8+7	1.9+10
24	3.8-4	1.2-2	5.4-6	2.6+2	1.1+6	2.6+8
25	2.6-3	3.3-2	3.4-5	4.7+2	3.3+6	1.6+8
26	2.0-1	7.9-1	1.4-3	1.7+3	8.4+6	9.6+8
27	0.0	4.2-6	0.0	4.7	2.8+4	4.4+5
28	8.0-3	7.6-2	9.1-5	5.5+2	3.8+6	2.3+8
29	3.7-1	1.3	2.0-3	1.9+3	9.0+6	1.3+9
30	4.9	2.9+1	4.0-3	6.6+3	2.1+7	1.2+10
31	0.0	6.2-5	0.0	6.7	3.2+4	9.3+5
32	0.0	3.2-4	0.0	2.6+1	1.3+5	4.9+6
33	0.0	3.4-4	0.0	4.3+1	2.2+5	7.8+6
34	6.4	2.8+1	5.2-3	6.0+3	2.0+7	1.1+10
35	6.5	3.1+1	5.2-3	6.1+3	2.0+7	1.1+10
36	2.4+1	1.8+2	5.2-3	9.8+3	2.9+7	1.8+10
37	1.3-2	2.2-1	1.1-4	8.1+2	4.8+6	3.8+8
38	0.0	0.0	0.0	1.8+1	1.3+5	1.9+6
39	0.0	3.9-4	0.0	7.9+1	5.6+5	2.1+7

Table B-29 (Continued)
MACCS ESTIMATES OF MEAN CONSEQUENCES FOR CENTRAL-ESTIMATE BINS

Bin	Early Fatalities	Early Injuries	Individual Risk (Conditional) (0-1 Miles)	Latent Cancer Fatalities	Population Dose--50 Miles (Person-Rem)	Offsite Costs ($)
40	5.1-1	1.8	2.2-3	1.9+3	9.2+6	1.8+9
41	5.9	1.5+1	4.9-3	6.0+3	2.0+7	1.1+10
42	5.1-1	1.8	2.2-3	1.9+3	9.2+6	1.8+9
43	5.1-1	1.8	2.2-3	1.9+3	9.2+6	1.8+9
44	6.2	1.7+1	4.7-3	6.0+3	2.0+7	1.1+10
45	5.9	1.5+1	4.9-3	6.0+3	2.0+7	1.1+10
46	1.7+1	1.2+2	4.1-3	9.6+3	2.8+7	1.9+10
47	1.7+1	1.2+2	4.2-3	9.7+3	2.8+7	1.9+10
48	1.7+1	1.2+2	4.2-3	9.7+3	2.8+7	1.9+10
49	0.0	0.0	0.0	1.9+1	8.6+4	1.5+6
50	0.0	4.5-4	0.0	8.2+1	3.5+5	5.1+7
51	1.8-5	1.1-3	2.7-7	1.3+2	5.2+5	7.5+7
52	0.0	1.3-4	0.0	1.7+1	1.8+5	2.3+6
53	0.0	1.6-5	0.0	6.3	4.5+4	5.9+5
54	3.9-4	3.2-2	5.6-6	1.0+2	2.6+5	1.1+7
55	0.0	0.0	0.0	0.0	0.0	0.0
56	0.0	0.0	0.0	0.0	0.0	0.0
57	7.8	7.2+1	2.4-3	7.9+3	2.3+7	1.6+10
58	1.5	2.2+1	2.1-3	6.4+3	1.9+7	1.1+10
59	4.9	5.3+1	2.5-3	7.4+3	2.2+7	1.4+10
60	7.1-5	7.4-3	1.0-6	1.1+3	5.5+6	4.5+8
61	1.4-1	6.9-1	7.7-4	2.4+3	1.1+7	2.7+9
62	1.4-1	7.2-1	7.9-4	2.4+3	1.1+7	2.7+9
63	6.3	6.0+1	2.3-3	7.6+3	2.2+7	1.5+10
64	6.8	6.3+1	2.4-3	7.7+3	2.2+7	1.5+10
65	3.2+1	2.8+2	1.7-3	1.2+4	3.1+7	2.4+10
66	3.2+1	2.8+2	1.7-3	1.2+4	3.1+7	2.4+10
67	1.5-6	2.3-3	2.3-8	1.4+2	3.3+5	1.8+7
68	0.0	3.0-6	0.0	3.3+1	1.0+5	2.6+6
69	2.1-5	4.4-3	3.2-7	1.6+2	5.9+5	2.0+7
70	0.0	1.3-4	0.0	4.9+1	2.9+5	5.6+6
71	0.0	0.0	0.0	3.4	2.7+4	4.1+5
72	0.0	0.0	0.0	1.0+1	1.1+5	1.2+6
73	0.0	1.7-3	0.0	8.8+1	2.3+5	8.5+6
74	0.0	0.0	0.0	1.0+1	2.6+4	5.8+5
75	0.0	0.0	0.0	3.7+1	7.8+4	3.7+6
76	0.0	0.0	0.0	0.0	0.0	0.0
77	0.0	0.0	0.0	0.0	0.0	0.0

[1] Values in this table are written in shorthand notation: 2.4-3 = 2.4×10^{-3}

108

Table B-30

CRAC2 ESTIMATES OF MEAN CONSEQUENCES FOR CENTRAL-ESTIMATE BINS

Bin	Early Fatalities	Early Injuries	Individual Risk (Conditional) (0-1 Miles)	Latent Cancer Fatalities	Population Dose--50 Miles (Person-Rem)	Offsite Costs ($)
1	0.0	2.2-3[1]	0.0	9.2+1	6.8+5	8.7+6
2	0.0	0.0	0.0	0.0	0.0	0.0
3	4.1-2	7.9-1	2.4-4	7.9+2	4.0+6	7.0+7
4	2.3-1	1.3	2.6-4	1.5+3	7.6+6	1.5+8
5	0.0	0.0	0.0	0.0	0.0	0.0
6	0.0	9.4-5	0.0	4.1	4.1+4	1.6+6
7	3.1-3	2.6-1	4.5-5	2.8+2	2.9+6	1.8+7
8	0.0	0.0	0.0	1.7+1	1.1+5	1.9+6
9	0.0	3.9-4	0.0	6.9+1	4.3+5	5.3+6
10	0.0	0.0	0.0	6.7	4.7+4	1.6+6
11	0.0	0.0	0.0	5.5	2.9+4	1.6+6
12	4.7-2	8.2-1	2.4-4	7.8+2	3.5+6	7.9+7
13	2.6-1	1.3	2.5-4	1.2+3	4.1+6	1.4+8
14	0.0	8.9-3	0.0	1.4+2	1.2+6	1.8+7
15	5.5-2	9.1-1	2.7-4	1.1+3	7.0+6	1.0+8
16	0.0	6.1-5	0.0	2.9+1	1.9+5	2.2+6
17	0.0	3.8-2	0.0	1.9+1	1.7+5	1.7+6
18	1.3-4	6.5-2	2.0-6	2.7+1	2.5+5	1.8+6
19	5.2	1.5+1	3.5-3	2.6+3	1.8+7	2.5+8
20	1.5-3	5.1-2	2.3-5	3.2+2	2.6+6	3.1+7
21	2.6-2	6.1-1	2.0-4	7.1+2	3.9+6	6.5+7
22	4.7	3.2+1	2.4-3	2.7+3	1.8+7	2.5+8
23	1.1+1	2.2+2	3.4-3	4.1+3	2.3+7	5.2+8
24	0.0	5.5-3	0.0	7.7+1	5.4+5	2.0+6
25	0.0	2.3-3	0.0	1.7+2	1.0+6	1.4+7
26	4.7-3	2.1-1	5.4-5	6.7+2	3.2+6	1.0+8
27	0.0	0.0	0.0	2.2	1.5+4	1.6+6
28	0.0	5.1-3	0.0	2.0+2	1.2+6	1.9+7
29	1.5-2	4.0-1	1.3-4	7.8+2	3.7+6	1.1+8
30	3.9	8.3	3.4-3	2.2+3	1.4+7	2.9+8
31	0.0	5.1-3	0.0	3.9	3.3+4	1.6+6
32	0.0	9.7-3	0.0	8.2	7.3+4	1.6+6
33	0.0	1.6-2	0.0	1.1+1	9.8+4	1.6+6
34	5.0	1.4+1	3.5-3	2.6+3	1.8+7	2.3+8
35	5.2	1.5+1	3.5-3	2.6+3	1.8+7	2.5+8
36	8.4	3.5+2	1.7-3	4.6+3	2.5+7	5.9+8
37	1.1-3	4.5-2	1.7-5	2.9+2	2.5+6	2.6+7
38	0.0	0.0	0.0	5.2	3.7+4	1.6+6
39	0.0	2.4-4	0.0	2.1+1	1.5+5	1.7+6

Table B-30 (Continued)
CRAC2 ESTIMATES OF MEAN CONSEQUENCES FOR CENTRAL-ESTIMATE BINS

Bin	Early Fatalities	Early Injuries	Individual Risk (Conditional) (0-1 Miles)	Latent Cancer Fatalities	Population Dose--50 Miles (Person-Rem)	Offsite Costs ($)
40	2.6-2	6.1-1	2.0-4	7.1+2	3.9+6	6.5+7
41	4.7	3.2+1	2.4-3	2.7+3	1.8+7	2.5+8
42	2.3-2	5.9-1	1.9-4	7.0+2	3.9+6	6.3+7
43	2.6-2	6.1-1	2.0-4	7.1+2	3.9+6	6.5+7
44	4.3	4.5+1	1.6-3	2.8+3	1.8+7	2.4+8
45	4.7	3.2+1	2.4-3	2.7+3	1.8+7	2.5+8
46	1.0+1	1.9+2	3.3-3	4.1+3	2.3+7	4.9+8
47	1.1+1	2.2+2	3.4-3	4.1+3	2.3+7	5.2+8
48	1.1+1	2.2+2	3.4-3	4.1+3	2.3+7	5.2+8
49	0.0	0.0	0.0	5.6	3.8+4	1.6+6
50	0.0	3.8-4	0.0	2.3+1	1.6+5	1.6+6
51	0.0	8.9-4	0.0	3.0+1	1.9+5	1.7+6
52	0.0	0.0	0.0	5.0	3.7+4	1.6+6
53	0.0	0.0	0.0	2.6	1.8+4	1.6+6
54	0.0	0.0	0.0	3.3+1	2.6+5	2.6+6
55	0.0	0.0	0.0	0.0	0.0	0.0
56	0.0	0.0	0.0	0.0	0.0	0.0
57	1.7	1.7+2	5.3-4	3.7+3	2.1+7	4.3+8
58	2.7	5.7	3.2-3	1.9+3	1.2+7	2.9+8
59	1.3	7.2+1	5.9-4	3.3+3	2.1+7	3.5+8
60	1.2-4	2.6-2	1.9-6	3.2+2	2.0+6	2.7+7
61	2.1-2	5.4-1	1.8-4	6.5+2	2.7+6	6.8+7
62	2.2-2	5.8-1	1.9-4	6.7+2	2.7+6	7.0+7
63	1.4	1.2+2	5.3-4	3.6+3	2.1+7	3.8+8
64	1.6	1.5+2	5.3-4	3.6+3	2.1+7	3.9+8
65	2.7	6.1+2	5.3-4	5.4+3	2.6+7	1.0+9
66	2.7	6.1+2	5.3-4	5.4+3	2.6+7	1.0+9
67	0.0	0.0	0.0	5.0+1	3.9+5	3.3+6
68	0.0	0.0	0.0	9.9	6.6+4	1.7+6
69	0.0	1.4-5	0.0	5.9+1	4.7+5	3.5+6
70	0.0	0.0	0.0	1.5+1	1.0+5	1.7+6
71	0.0	0.0	0.0	1.7	1.1+4	1.6+6
72	0.0	0.0	0.0	3.2	2.3+4	1.6+6
73	0.0	0.0	0.0	2.8+1	2.3+5	2.3+6
74	0.0	0.0	0.0	3.0	2.1+4	1.6+6
75	0.0	0.0	0.0	8.2	5.4+4	1.7+6
76	0.0	0.0	0.0	0.0	0.0	0.0
77	0.0	0.0	0.0	0.0	0.0	0.0

---

[1] Values in this table are written in shorthand notation: 2.2-3 = 2.2 x 10^{-3}

Table B-31

MACCS ESTIMATES OF MEAN CONSEQUENCES FOR PEACH BOTTOM LLH CLUSTERS

Bin	Early Fatalities	Early Injuries	Individual Risk (Conditional) (0-1 Miles)	Latent Cancer Fatalities	Population Dose--50 Miles (Person-Rem)	Offsite Costs ($)
1	0.0	1.2-4[1]	0.0	5.9	9.9+4	9.1+6
2	0.0	1.2-3	0.0	4.1+1	5.5+5	5.5+7
3	3.2-4	1.7-2	4.2-6	5.2+2	1.3+6	1.2+8
4	2.6-3	3.7-2	3.5-5	5.1+2	2.8+6	3.1+8
5	2.0-2	2.6-1	1.6-4	1.2+3	6.7+6	4.5+8
6	3.9-1	1.6	2.2-3	3.3+3	8.4+6	6.2+8
7	8.0-2	8.0-2	4.9-4	7.3+3	1.7+7	1.9+9
8	2.9-1	6.0	8.4-4	8.2+3	2.1+7	4.4+9
9	2.9	5.7+1	1.4-3	1.0+4	2.5+7	1.2+10
10	0.0	0.0	0.0	2.4	6.8+3	1.8+5
11	7.4-6	4.3-3	1.1-7	6.1+1	3.1+5	1.2+7
12	1.0-3	4.7-2	1.5-5	3.4+1	1.1+5	7.0+7
13	7.2-6	4.0-3	1.1-7	1.4+2	1.2+6	2.8+7
14	5.1-2	4.5-1	4.9-4	2.3+2	1.2+6	1.4+8
15	4.7-3	1.4-1	6.7-5	1.4+3	2.7+6	1.6+8
16	8.4-1	3.9	5.1-3	3.5+2	9.4+5	2.0+8
17	1.2-3	4.3-2	1.7-5	7.6	2.8+4	1.6+7
18	1.8-3	5.5-2	2.5-5	1.4+2	9.9+5	3.2+7
19	3.2-3	1.2-1	4.3-5	9.7+1	4.4+5	1.9+7
20	9.3-6	6.3-3	1.4-7	1.3+2	7.2+5	2.1+7
21	2.1-2	2.3-1	2.5-4	9.4+2	2.8+6	1.4+8
22	1.1-3	3.5-2	1.5-5	3.2+2	1.6+6	6.8+7
23	6.9-2	4.4-1	7.1-4	1.0+3	5.3+6	2.5+8
24	3.8-2	3.2-1	4.2-4	3.5+2	2.6+6	1.6+8
25	2.2-1	1.4	3.3-4	2.9+3	2.9+5	3.4+9
26	1.3-1	1.0	8.9-4	4.4+3	9.8+6	8.7+8
27	2.9	9.4	4.4-3	7.6+3	2.0+7	2.4+9
28	6.0-2	5.7-1	5.3-4	1.7+3	6.3+6	3.7+8
29	8.2-2	7.4-1	7.8-4	6.2+2	3.2+6	2.6+8
30	1.10	4.2	3.1-3	6.5+3	1.3+7	1.7+9
31	1.3-1	9.0-1	8.8-4	1.6+3	9.9+6	1.1+9
32	3.6	1.2+1	4.6-3	6.4+3	2.0+7	3.9+9
33	7.0-3	1.0-1	8.5-5	1.4+3	7.4+6	1.5+9
34	1.4-1	1.5	5.5-4	5.7+3	1.8+7	3.5+9
35	6.5	1.3+2	1.8-3	1.6+4	3.2+7	9.1+9
36	8.0-1	4.0	2.3-3	4.5+3	1.5+7	1.3+9
37	5.2-1	2.3	2.5-3	1.2+3	5.7+6	3.3+8

BEST COPY AVAILABLE

111

Table B-31 (Continued)

MACCS ESTIMATES OF MEAN CONSEQUENCES FOR PEACH BOTTOM LLH CLUSTERS

Bin	Early Fatalities	Early Injuries	Individual Risk (Conditional) (0-1 Miles)	Latent Cancer Fatalities	Population Dose--50 Miles (Person-Rem)	Offsite Costs ($)
38	3.2	3.1+1	2.7-3	8.4+3	2.2+7	5.5+9
39	6.1-1	5.8	2.1-3	8.7+3	2.0+7	2.9+9
40	1.2+1	2.0+2	2.1-3	1.8+4	3.3+7	1.1+10
41	1.6-1	1.1	7.2-4	5.2+3	1.1+7	1.5+9
42	8.2-1	5.6	6.2-4	1.4+3	3.5+6	2.8+8
43	5.5-1	3.2	2.8-3	5.4+3	1.7+7	2.2+9
44	5.6	4.3+1	4.4-3	8.4+3	2.6+7	6.4+9
45	1.1	4.9	5.4-3	3.1+3	1.1+7	8.5+8
46	4.90	3.8+1	4.4-3	1.2+4	2.0+7	5.0+9
47	4.2-1	5.3	1.2-3	4.1+3	1.5+7	4.6+9
48	2.7	1.3+1	1.4-2	2.9+3	1.2+7	9.2+8
49	1.3	5.5+1	1.8-3	1.4+4	2.3+7	6.0+9
50	1.7	3.8+1	8.8-4	4.6+3	1.5+7	1.8+9
51	3.6	3.0+1	1.4-2	6.5+3	2.0+7	2.0+9
52	2.5	8.0+1	1.1-3	7.4+3	2.1+7	4.3+9
53	9.1	2.6+2	1.9-3	1.2+4	2.9+7	9.7+9
54	0.0	0.0	0.0	0.0	0.0	0.0

[1] Some values in this table are written in shorthand notation: 1.2-4 = 1.2×10^{-4}

Table B-32

CRAC2 ESTIMATES OF MEAN CONSEQUENCES FOR PEACH BOTTOM LLH CLUSTERS

Bin	Early Fatalities	Early Injuries	Individual Risk (Conditional) (0-1 Miles)	Latent Cancer Fatalities	Population Dose--50 Miles (Person-Rem)	Offsite Costs ($)
1	0.0	4.5-3[2]	0.0	2.8	2.8+4	1.8+6
2	0.0	6.5-4	0.0	1.2+1	9.3+4	3.3+6
3	1.8-3	3.4-2	2.8-5	1.4+2	8.1+5	1.6+7
4	3.7-3	1.1-1	5.7-5	9.7+1	5.3+5	7.4+6
5	1.2-2	3.9-1	1.1-4	4.3+2	3.2+6	4.8+7
6	2.8-1	1.0	2.6-4	1.0+3	1.9+6	4.9+8
7	6.3-1	2.0+1	3.8-4	1.5+3	3.0+6	9.3+8
8	6.9-1	2.7+1	4.6-4	2.9+3	1.2+7	9.1+8
9	1.9	4.1+2	3.8-4	2.3+3	3.9+6	1.2+9
10	0.0	0.0	0.0	7.4-1	5.2+3	1.6+6
11	0.0	0.0	0.0	1.4+1	1.0+5	1.9+6
12	1.9-4	1.0-1	2.9-6	7.5	7.3+4	2.6+6
13	0.0	0.0	0.0	3.1+1	2.4+5	2.7+6
14	1.2-2	4.0-1	1.1-4	8.6+1	8.1+5	8.4+6
15	1.4-2	3.9-1	2.2-4	2.1+2	1.6+6	3.4+7
16	8.4-1	2.4	2.6-3	8.2+1	7.4+5	8.8+6
17	0.0	0.0	0.0	4.2	4.0+4	1.9+6
18	4.7-4	1.3-1	7.3-6	3.2+1	2.9+5	3.1+6
19	3.7-4	5.6-1	5.7-6	2.0+1	1.8+5	2.6+6
20	0.0	3.7-4	0.0	4.0+1	2.5+5	2.6+6
21	3.3-3	6.0-2	5.1-5	3.3+2	1.8+6	6.0+7
22	0.0	6.1-3	0.0	1.1+2	6.5+5	9.8+6
23	3.9-3	1.4-1	5.8-5	3.8+2	1.8+6	5.6+7
24	4.0-3	1.3-1	5.9-5	1.4+2	9.5+5	1.4+7
25	5.3-2	6.7-1	2.1-4	1.1+3	3.6+6	3.1+8
26	2.4-1	9.9-1	2.4-4	1.1+3	2.4+6	5.4+8
27	4.1	1.1+1	3.3-3	2.8+3	1.2+7	1.1+9
28	1.3-1	7.8-1	2.1-4	4.5+2	1.5+6	9.9+7
29	4.6-1	2.4	2.1-3	1.2+2	1.1+6	1.0+7
30	9.9-1	7.0	5.2-4	2.2+3	9.5+6	1.1+9
31	1.2-1	8.8-1	2.4-4	4.0+2	2.5+6	4.5+7
32	4.8	1.2+1	3.5-3	2.5+3	1.4+7	5.9+8
33	2.4-2	5.4-1	2.0-4	3.3+2	1.6+6	3.5+7
34	4.3-1	2.5	3.4-4	1.8+3	7.6+6	3.3+8
35	2.9	5.4+2	5.3-4	5.1+3	1.5+7	3.3+9
36	4.3-1	2.0	3.6-4	1.7+3	9.1+6	4.6+8
37	2.1-1	1.1	2.8-4	4.9+2	3.6+6	7.6+7

Table B-32 (Continued)

CRAC2 ESTIMATES OF MEAN CONSEQUENCES FOR PEACH BOTTOM LLH CLUSTERS

Cluster	Usage[1] Factor	Early Fatalities	Early Injuries	Individual Risk (0-1 Miles)	Latent Cancer Fatalities	Population Dos--50 Miles (Person-Rem)	Offsite Costs ($)
38	2.4	3.0+2		5.1-4	3.4+3	1.6+7	1.0+9
39	3.6	9.2		6.6-3	2.0+3	9.1+6	6.2+8
40	3.2	1.0+3		5.3-4	5.8+3	1.9+7	4.5+9
41	4.1-1	1.5		3.8-4	1.7+3	7.1+6	5.0+8
42	6.2-1	4.2		3.8-4	2.9+2	1.1+6	5.5+7
43	2.4	6.7		6.5-3	1.2+3	7.1+6	2.6+8
44	5.6	2.3+2		1.1-3	3.3+3	1.8+7	7.5+8
45	2.3	6.0		2.9-3	6.2+2	4.4+6	1.2+8
46	3.5	5.4+2		8.7-4	4.0+3	1.4+7	3.4+9
47	7.5-1	7.6		5.1-4	1.5+3	8.0+6	1.6+8
48	6.2	1.4+1		3.5-2	6.2+2	4.7+6	1.0+8
49	2.6	3.9+2		5.1-4	4.3+3	1.4+7	3.4+9
50	2.1	1.1+2		4.4-4	1.1+3	2.3+6	2.5+8
51	9.2	2.5+1		4.7-2	1.4+3	8.2+6	3.5+8
52	2.1	3.3+2		3.8-4	1.6+3	2.5+6	6.0+8
53	4.6	1.2+3		3.8-4	2.2+3	3.5+6	1.4+9

---

[1] This is the frequency of usage for each cluster, given core damage.

[2] Some values in this table are written in shorthand notation: 4.5-3 = 4.5×10^{-3}

11L

BEST COPY AVAILABLE

References for Appendix B

1. Kuhlman, M. R., et al. CORSOR User's Manual U.S. Nuclear Regulatory Commission Report NUREG/CR-4173, Volume 1, Battelle's Columbus Division (Report BMI-2122), Columbus, OH: March, 1985.

2. Denning, R. S., et al. *Radionuclide Release Calculations for Selected Severe Accident Scenarios: BWR, Mark I Design.* BMI-2139, Volume 1 (Draft Report), Battelle's Columbus Division, Columbus, OH: May, 1986. (See also Reference 7)

3. Lipinski, R. J., et al. *Uncertainty in Radionuclide Release Under Specific LWR Accident Conditions.* Sandia National Laboratories Report SAND84-0410, Vol. 2, Albuquerque, NM: February, 1985.

4. *Reactor Risk Reference Document* U.S. Nuclear Regulatory Commission Report NUREG-1150, Volume III, Appendix J. Washington , DC: February, 1987.

5. Benjamin, A. S., et al. *Evaluation of Severe Accident Risks and the Potential for Risk Reduction: Surry Power Station, Unit 1.* U.S. Nuclear Regulatory Commission Report NUREG/CR-4551, Volume 1 (Draft Report for Comment), Sandia National Laboratories, Albuquerque, NM: February, 1987.

6. Benjamin, A. S., et al. *Evaluation of Severe Accident Risks and the Potential for Risk Reduction: Sequoyah Power Station, Unit 1.* U.S. Nuclear Regulatory Commission Report NUREG/CR-4551, Volume 2 (Draft Report for Comment), Sandia National Laboratories, Albuquerque, NM: February, 1987.

7. Denning, R. S., et al. *Radionuclide Release Calculations for Selected Severe Accident Scenarios: BWR, Mark I Design.* U.S. Nuclear Regulatory Commission Report NUREG/CR-4624, Volume 1, Battelle's Columbus Division, Columbus, OH: July, 1986.

8. Bradley, D. R. and A. W. Shriver. "Uncertainty in the Ex-Vessel Source Term Caused by Uncertainty in In-Vessel Models." *Proceedings of the International ANS/ENS Topical Meeting on Reactor Safety*, San Diego, CA: February, 1986.

9. *Reactor Safety Study--An Assessment of Accident Risks in U.S. Commercial Nuclear Power Plants.* U. S. Nuclear Regulatory Commission Report WASH-1400, (NUREG 75/014), Washington, DC: 1975.

10 *IDCOR Technical Issue Resolution Document.* Technology for Energy Corporation, Knoxville, TN: 1985.

11 *IDCOR Task 21.3* Technology for Energy Corporation, Knoxville, TN: 1985.

12 *IDCOR 85.2* Technology for Energy Corporation, Knoxville, TN: 1985.

13. Helton J. C., et al. *Incorporation of Uncertainties into Reactor Accident Source Term Estimates* U.S. Nuclear Regulatory Commission Report NUREG/CR-XXXX, Sandia National Laboratories, Albuquerque, NM: April, 1987.

14. Amos. C. N., et al. *Evaluation of Severe Accident Risks and the Potential for Risk Reduction: Grand Gulf Power Station, Unit 1* U.S. Nuclear Regulatory Commission Report NUREG/CR-4551, Volume 4 (Draft Report for Comment), Sandia National Laboratories, Albuquerque, NM: February, 1987.

15. Gelbard, F., and J. H. Seinfeld. "Simulation of Multi-Component Aerosol Dynamics," *Journal of Colloid Interface Science: 78*, P. 485, 1980.

16. Aldrich. D. C., et al. *Technical Guidance for Siting Criteria Development*. U.S. Nuclear Regulatory Commission Report NUREG/CR-2239, Sandia National Laboratories, Albuquerque, NM: 1981.

17. Alpert. D. J., et al. *A Demonstration of Uncertainty/Sensitivity Analysis Using the Health and Economic Consequence Model CRAC2*. U.S. Nuclear Regulatory Commission Report NUREG/CR-4199, Sandia National Laboratories, Albuquerque, NM: 1985.

18. Batchelor, B. G. and P. R. Wilkens. "Methods for Location of Clusters to Patterns to Initialize a Learning Machine," *Electronic Letters*, Vol. 5, No. 20, pp.481-483: 1969.

19. MacQueen, J. "Some Methods for Classification and Analysis of Multivariate Data" *Proceedings of the Fifth Symposium on Prabablities and Statistics*, University of California Press, Berkely, CA: 1967.

Appendix C

LISTING OF RISK RESULTS FOR PEACH BOTTOM

117

CONTENTS

Section | Page

C.1 LISTING OF RISQUE OUTPUT: LLH ESTIMATE WITH MACCS CONSEQUENCES .... C-3 -122

C.2 LISTING OF RISQUE OUTPUT: LLH ESTIMATE WITH CRAC2 CONSEQUENCES .... C-134 -253

C.3 LISTING OF RISQUE OUTPUT: CENTRAL ESTIMATE WITH MACCS CONSEQUENCES .... C-242 -361

C.4 LISTING OF RISQUE OUTPUT: CENTRAL ESTIMATE WITH MACCS CONSEQUENCES .... C-256 -375

C.5 STATISTICAL ANALYSIS OF PEACH BOTTOM RESULTS .... C-269 -388

  C.5.1 Regression Analysis of LLH Issues .... C-270 -389

  C.5.2 Statistical Analysis of the Levels of the Significant LLH Issues ...... C-276 -395

LIST OF FIGURES

Figure — Page

C-1. Rank Regression of Issues Significantly Affecting the Uncertainty in the Risk of Early Fatality C-273

C-2. Rank Regression of Issues Significantly Affecting the Uncertainty in the Risk of Early Illness C-273

C-3. Rank Regression of Issues Significantly Affecting the Uncertainty in the Individual Risk of Fatality C-274

C-4. Rank Regression of Issues Significantly Affecting the Uncertainty in the Risk of Latent Cancer Fatality C-274

C-5. Rank Regression of Issues Significantly Affecting the Uncertainty in the Population Dose Risk Measure C-275

C-6. Rank Regression of Issues Significantly Affecting the Uncertainty in the Property Damage Risk Measure C-275

C-7. Rank Regression of Levels of Issues Significantly Affecting the Uncertainty in the Risk of Early Fatality C-277

C-8. Rank Regression of Levels of Issues Significantly Affecting the Uncertainty in the Risk of Early Illness C-277

C-9. Rank Regression of Levels of Issues Significantly Affecting the Uncertainty in the Individual Risk of Fatality C-278

C-10. Rank Regression of Levels of Issues Significantly Affecting the Uncertainty in the Risk of Latent Cancer Fatality C-278

C-11. Rank Regression of Levels of Issues Significantly Affecting the Uncertainty in the Population Dose Risk Measure C-279

C-12. Rank Regression of Levels of Issues Significantly Affecting the Uncertainty in the Property Damage Risk Measure C-279

Appendix C
LISTING OF RISK RESULTS FOR PEACH BOTTOM

The principal results of the risk assessment for Peach Bottom are summarized in Section 5 of the main report. The full output from the RISQUE code is listed in this Appendix both to illustrate the level of detail in the results available from the code, and to provide the full results for some of the risk measures that were not discussed extensively in the main report.

The LLH results calculated using the MACCS code are contained in Section C.1. Section C.2 provides the same output for the results obtained using CRAC2. The results of the central estimate are presented in Section C.3 for MACCS and C.4 for CRAC2. Additional statistical analysis of the results is presented in Section C.5.

The first portion of the output lists each LLH issue and its level in each of the 150 sample members. There are three groups of issues (sequence, containment, and source term), and the issues are listed and numbered in the order in which they are discussed in Section 4 of the main report. The core-melt frequencies for each of the 150 sample members are then tabulated, sorted in order of increasing frequency. For each of the risk measures, the following results are then presented:

- The risk values for all 150 sample members, sorted in order of increasing risk;
- The risk values in the same order, along with the levels for each issue;
- The fractional contribution of each core-damage sequence or plant-damage state to the mean of the risk sample;
- The fractional contribution of each accident-progression bin to mean risk;
- The fractional contribution of each of the release clusters to mean risk; and

Following the fractional contributions of each cluster for each of the risk measures, the results of the two statistical tests performed by the RISQUE code described in Chapter 2 of the main report are presented: the rank-regression results are presented first, followed chi-squared test. The multi-variate rank regression of the results is listed in Section C.5. Then, following the chi-squared results for the last of the consequence measures, a detailed analysis of twenty specific sample members is provided for two of the consequence measures: early fatalities and latent cancer fatalities. This detailed analysis identifies the contribution to the risk for each sample member from each plant-damage state, accident -progression bin, and source-term cluster. The results for individual sample members allow more detailed examination of the contributing factors. The sample members with the lowest and highest risk are selected to give

120

a perspective on the reasons for the bounds of the LLH result. (It is possible to print out the detailed sample member results for all of the samples and all of the consequence measures, but the output was reduced here for practical reasons.)

Finally, for all four sets, the results are presented in terms of various measures of equivalent onsite and offsite costs. It is these values that are used in addressing the cost/benefit features of the risk-reduction measures that were evaluated.

The results include reference to "dummy" issues that were not examined in the current results. It was efficient to set up the problem and the code allowing for more issues to be introduced directly so that the sampling would not have to be repeated.

The central estimate results are presented in a similar format, although obviously there are no individual sample members and statistical tests are not provided.

C.1 LISTING OF RISQUE OUTPUT: LLH ESTIMATE WITH MACCS CONSEQUENCES

```
1     ISSUE LEVELS FOR ALL SAMPLE MEMBERS
      ISSGP  ISS                        LEVELS

1     1       SLC FAILURE TO ACTUATE

1     1:  2 3 2 2 2 3 2 2 3 3 2 1 3 3 3 2 2 3 1 2 2 3 3 3 2 1 2 3 2 2 3 2 4 4 3 3 3 3 1 4 2 3 3 2 1 3 1 2 4 3
          4 1 1 3 3 2 4 2 2 3 3 2 2 1 2 3 2 3 3 2 3 4 2 4 1 1 2 4 2 1 2 3 3 3 3 3 2 1 3 3 2 4 2 2 3 3 2 4 2 3
          3 2 3 2 2 2 2 2 3 3 2 3 2 2 2 2 2 4 1 3 2 3 2 3 3 3 3 2 2 4 4 3 3 3 1 3 2 3 2 2 3 3 4 3 2 2 3 3 2 2

      2       DC COMMON MODE

      2:  3 3 2 2 3 2 2 3 3 2 3 1 1 3 2 1 2 1 1 4 4 4 2 3 3 2 3 4 2 3 3 2 3 4 2 3 2 3 2 2 3 2 3 4 3 3 3 2 3 3
          2 2 4 1 2 2 2 3 3 2 3 3 3 3 1 3 3 2 2 3 2 2 3 4 3 2 2 2 3 3 2 2 1 3 3 2 3 2 2 4 2 3 3 3 2 3 1 3 3 2
          1 2 2 1 2 3 2 3 3 2 3 3 4 2 4 2 3 2 3 4 1 2 2 2 2 4 2 2 2 3 2 3 2 3 1 2 3 3 3 3 3 2 2 3 1 2 2 4 4 1

      3       FAILURE TO VENT

      3:  3 3 2 2 2 1 3 3 2 3 3 3 4 2 3 2 3 3 2 2 3 4 3 1 4 2 3 2 2 2 3 2 3 3 2 3 3 4 3 1 2 3 2 3 3 2 2 1 3 2
          3 2 3 2 3 2 2 1 2 1 2 2 3 2 3 2 3 3 3 3 3 3 3 3 1 2 3 1 2 3 2 3 2 2 4 2 2 2 3 3 2 3 4 4 2 2 3 3 2 1
          2 2 2 2 2 2 2 2 1 3 3 3 2 3 3 3 1 2 3 3 3 4 4 2 3 4 2 2 2 3 1 2 2 4 3 2 2 2 4 1 3 3 4 1 4 3 1 2 3 4

      4       SW MOD A VS. MOD B

      4:  1 2 2 1 1 1 1 1 1 1 2 1 1 1 1 2 1 2 1 1 1 1 2 1 2 2 1 2 1 1 1 1 1 2 1 1 1 2 1 2 1 1 1 2 2 1 1 1 2 2
          1 2 2 1 1 2 1 2 1 2 1 1 2 1 2 1 1 1 2 1 2 2 2 2 1 2 2 1 1 1 1 1 2 2 1 1 1 1 1 1 1 1 2 2 1 2 2 2 1 2
          1 2 1 2 2 2 2 1 1 2 1 2 1 2 1 2 1 2 2 1 1 1 1 1 2 1 1 1 1 1 2 2 1 2 2 2 2 2 1 1 2 1 2 2 1 2 1 2 1 1

      5       POWER RECOVERY

      5:  3 2 2 1 2 2 3 4 4 2 2 2 3 3 3 3 1 4 2 2 4 2 3 2 2 4 3 3 3 2 1 2 3 1 2 3 3 2 3 3 2 2 3 2 1 2 3 3 3 2
          4 2 1 2 3 2 3 3 2 3 2 2 2 2 2 1 3 3 1 1 3 2 3 2 2 4 3 2 3 2 4 4 1 2 3 3 2 2 1 2 2 2 3 3 1 3 2 2 2 3
          2 3 3 1 2 3 2 3 1 2 3 3 3 2 3 3 3 3 3 4 3 3 4 2 3 3 3 2 4 2 2 2 3 2 2 2 3 3 4 3 2 3 1 2 3 2 3 4 3 4


2     1       PROB. OF STUCK OPEN VAC. BRKR.

2     1:  3 2 3 2 4 2 3 2 1 3 2 3 3 3 3 3 3 2 2 3 2 3 2 3 3 3 2 2 4 2 1 4 2 2 3 3 2 3 2 4 3 2 2 3 3 1 3 2 3 2
          2 2 3 3 4 1 2 3 2 3 2 3 3 2 4 2 2 3 2 3 2 3 3 3 3 4 4 4 2 3 2 1 2 2 2 1 2 2 3 2 2 3 2 3 1 4 1 3 1 2
          3 1 3 4 2 2 2 2 2 2 2 1 3 3 4 1 2 2 2 3 1 3 2 4 2 2 2 3 2 3 3 2 3 1 3 3 3 3 4 3 3 2 3 3 2 3 1 3 4 2

      2       HPSN-SPRAY

      2:  2 2 3 3 3 3 2 2 2 1 2 4 2 1 2 2 2 1 4 4 2 3 3 4 1 2 3 2 3 4 2 3 3 4 3 2 2 2 3 4 2 3 2 2 2 2 4 2 2 3
          3 3 2 2 3 3 3 2 1 3 2 3 2 2 3 3 2 4 3 2 2 3 2 2 2 1 2 1 3 2 2 3 1 3 1 2 3 3 3 2 2 2 2 3 3 4 2 3 2 3
          1 1 3 1 2 2 3 3 3 3 4 3 2 3 2 2 3 4 3 3 3 3 3 2 4 2 3 1 3 3 2 2 3 2 4 2 3 3 3 3 3 2 3 2 3 4 1 2 1 3

      3       VENT-SBO-NACR

      3:  1 2 2 3 2 2 1 3 2 2 2 2 4 1 2 1 3 3 2 4 2 2 4 3 2 3 2 3 2 2 2 3 1 3 2 2 2 3 2 2 1 3 2 3 2 3 2 4 4 2
          4 2 3 2 2 3 2 3 3 3 3 3 2 3 2 3 3 4 2 3 3 1 3 2 2 2 3 1 3 1 3 3 2 3 4 2 2 3 4 2 3 3 2 2 2 3 3 1 3 2
          4 3 4 3 2 2 3 2 4 2 3 1 3 4 3 2 3 2 3 1 3 2 3 3 3 4 3 3 2 3 1 3 2 3 2 3 2 1 3 4 3 3 2 2 1 2 3 3 2 2

      4       VENT-SBO-ACR

      4:  1 1 2 4 3 1 3 3 2 2 2 2 3 4 2 2 2 3 2 3 3 2 2 3 3 3 3 2 2 4 3 2 3 2 3 2 2 2 2 2 3 4 2 2 3 3 3 1 3 2
          3 2 3 2 2 2 3 2 1 3 2 2 4 2 2 2 4 3 2 3 3 2 2 2 3 2 3 4 1 3 2 2 1 3 3 2 4 3 2 3 3 2 3 3 2 3 4 2 1 3
          2 1 2 3 3 2 3 3 3 1 2 2 3 4 2 3 3 3 4 3 3 3 3 3 1 2 4 3 1 2 4 2 3 3 2 4 2 1 3 3 2 1 3 1 3 2 4 2 3 2

      5       SP BYPASS, SMALL/LARGE

      5:  1 1 1 1 2 1 1 1 1 2 1 1 1 1 1 2 1 1 2 1 2 1 1 1 1 1 1 1 1 1 1 1 2 1 1 1 1 1 1 1 1 1 1 1 2 1 1 1 2 1
          2 1 1 2 2 1 1 1 1 2 1 1 2 1 1 1 2 1 1 2 1 2 1 1 1 1 1 1 2 1 1 1 1 2 2 1 1 1 1 1 1 1 1 2 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 1 2 1 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 2 1 1 1 1 1 1 1 1 1 1

      6       CONT FAILURE PRESS. (T<500F B VB)

      6:  7 9 9 6 6 1 5 6 9 2 2 3 8 5 7 6 6 7 6 5 7 3 8 3 6 8 7 3 6 5 4 8 6 5 9 6 3 7 6 6 5 6 7 3 3 2 3 6 3 8
          6 4 9 5 8 6 3 4 4 5 6 8 9 8 7 6 8 7 7 7 3 7 1 6 5 2 6 8 5 6 7 6 8 6 7 9 7 5 5 6 9 3 5 3 5 5 5 4 5 2
          2 2 6 3 6 4 8 7 6 5 2 3 6 6 6 8 7 3 7 6 3 2 6 8 8 8 7 3 9 6 4 3 5 4 2 2 7 9 3 5 6 5 6 6 6 9 9 5 6 4

      7       LATE FAILURE LOCATION (800-1200 A VB)

      7:  2 3 2 3 2 3 2 2 2 2 3 3 3 3 3 2 2 3 2 3 3 2 2 3 3 2 2 3 3 3 3 2 3 1 2 2 2 2 2 2 2 2 3 3 2 2 3 2 3 2
          2 3 2 2 2 3 2 2 2 2 2 1 2 2 2 2 2 2 2 2 2 2 2 3 1 2 2 3 2 2 3 2 3 2 2 2 2 2 3 3 2 2 2 2 2 3 2 2 3 3
          2 2 2 3 2 1 2 2 2 3 3 3 3 2 2 2 3 2 3 2 2 2 2 3 3 2 2 2 2 2 3 3 3 2 2 2 3 3 3 2 2 2 3 1 2 3 2 2 2 3

      8       CONT FAILURE SI         E, RAPID PRESS.

      8:  2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1 2 2 2 2 2 2 2 2 2 2 1 2 2 1 2 2 2 2 2 2 2 2 2
          1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1 2 2 2 2 2 2 1 1 2 2 2 2 2 2 2 1 2 2 2 2 1 2 1
          2 2 2 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1 2 1 2 2 2 2 2 2 2 2 2 2 2 2 2 1 2 2 1 2 2 2 2 2 2

      9       CONT FAILURE SI         E, SLOW PRESS.
```

```
     9:  1 2 2 2 1 1 2 2 1 2 1 1 1 1 1 1 2 2 2 1 2 2 2 2 2 1 1 2 2 1 1 2 2 1 1 2 2 1 1 2 1 2 1 1 1 2 1 2 1 1
         1 2 1 1 1 2 1 2 1 1 1 1 1 1 1 1 1 2 2 2 1 2 1 1 2 1 1 2 2 2 1 1 1 2 1 2 1 2 1 2 2 1 2 2 2 1 2 1 2 1
         1 1 1 2 1 2 1 2 2 2 1 2 1 2 2 1 2 2 2 1 2 2 2 1 2 2 1 2 1 1 1 2 2 2 2 1 1 1 2 1 2 2 1 1 2 2 2 2 2 2

    10      VB MODE, HIGH-P FLOW MELT

    10:  1 2 1 2 1 1 2 1 2 1 2 2 1 2 2 1 1 2 1 1 1 2 1 1 2 1 2 1 2 2 2 2 2 1 1 1 2 1 1 2 1 1 1 2 2 2 2 2 2 2
         2 1 1 2 2 2 1 1 2 1 2 2 1 1 2 2 2 1 1 1 2 1 1 1 2 2 2 2 2 2 2 1 2 2 1 1 2 1 1 2 1 1 2 2 1 1 1 2 1 2
         1 1 2 2 1 2 1 1 2 1 2 1 1 1 1 1 1 1 2 1 1 1 1 2 2 2 1 1 2 2 1 2 2 2 2 1 1 1 2 2 1 2 2 1 2 1 2 2 1 2

    11      CONT PRESS. BEFORE VB, LONG TERM TB

    11:  2 3 2 1 2 1 2 2 2 2 3 2 3 2 3 2 3 1 2 3 2 3 2 2 2 2 3 2 3 2 2 3 3 2 2 1 3 2 2 2 3 4 3 2 3 2 2 3 3 2
         2 3 2 2 2 2 3 2 2 2 2 2 3 2 1 2 3 3 3 2 2 2 3 2 2 2 4 1 2 3 1 2 3 3 1 3 3 2 2 3 2 2 2 2 3 1 2 2 2 3
         2 3 3 2 1 1 2 2 2 2 1 3 2 1 3 2 3 2 2 2 2 3 3 2 3 2 2 3 3 2 2 2 1 3 1 3 4 1 3 3 2 3 3 4 2 3 2 2 3 2

    12      PRESSURE RISE AT VB

    12:  2 3 3 2 1 2 3 4 4 2 2 2 5 3 4 3 5 3 4 1 1 1 3 2 2 3 2 5 5 5 2 2 3 1 1 5 3 1 1 4 5 4 1 5 3 3 2 3 2 2
         3 2 2 3 2 2 2 2 3 5 1 4 2 2 3 2 2 2 1 2 1 1 2 3 2 1 1 3 2 5 1 4 4 2 2 1 3 4 3 5 4 4 2 1 4 5 2 5 1 3
         3 3 1 2 1 3 2 1 1 2 3 3 4 2 3 4 2 1 2 4 4 3 2 1 4 4 3 2 1 2 1 3 2 5 3 5 3 3 1 3 4 1 1 3 2 3 4 4 2 3

    13      DELTA P DUE TO SUMP WATER INTERACT.

    13:  2 1 2 1 1 1 1 2 1 2 2 1 1 1 3 1 2 1 1 2 2 2 1 1 1 3 1 3 2 2 2 1 1 2 2 1 2 2 2 1 2 2 3 1 1 2 3 1 2 2
         2 2 1 2 1 2 1 2 2 2 1 3 2 1 1 2 1 1 2 2 3 2 2 2 1 1 2 2 2 3 2 2 2 1 1 3 1 1 2 1 2 1 1 1 2 2 3 1 1 1
         2 1 2 2 1 2 1 3 2 2 2 2 1 2 1 1 1 2 2 1 1 1 2 1 2 2 2 2 1 1 2 1 3 2 2 2 2 2 1 2 3 2 2 2 3 2 2 2 3 1

    14      PROB OF DRY DW MELT THROUGH

    14:  2 1 1 2 2 1 1 1 1 1 2 1 1 2 1 2 1 2 1 1 2 1 2 1 1 2 1 2 1 1 2 2 2 1 1 1 2 2 1 1 1 2 1 2 1 2 2 1 1 2
         1 1 1 2 2 1 2 2 1 2 2 1 1 2 1 2 2 1 2 2 1 2 2 1 1 2 2 1 1 2 2 1 2 1 1 2 1 2 1 1 2 1 1 1 1 1 1 2 2 2
         2 1 1 2 2 2 2 1 2 2 2 1 2 2 2 1 2 1 1 2 2 2 2 1 2 2 2 2 1 2 1 1 2 1 1 2 1 2 1 1 2 1 2 2 1 1 2 2 1 2

    15      PROB OF WET DW MELT THROUGH

    15:  2 2 2 2 1 2 2 1 2 2 2 2 2 2 1 2 1 1 1 1 1 2 1 2 2 2 1 1 1 1 1 2 2 2 2 2 2 1 1 2 2 1 2 2 1 1 2 1 1 2
         1 2 2 1 1 2 2 1 2 2 1 1 1 2 1 2 1 1 1 2 1 2 2 2 1 2 2 1 2 1 2 1 2 1 2 1 2 1 2 2 2 1 1 2 2 2 2 2 2 2
         1 2 1 1 2 1 2 2 2 2 2 2 2 2 2 1 2 2 1 2 2 2 2 2 2 2 2 2 1 1 1 1 2 2 2 1 2 1 1 2 1 1 2 2 2 1 2 1 2 1

    16      PROB OF DW M-THRU W/HI-P MELT EJECT

    16:  2 2 2 2 2 1 2 1 1 1 2 1 2 2 1 2 1 1 2 1 2 2 1 1 1 1 1 2 2 1 2 1 2 1 2 1 1 1 2 2 1 2 1 2 2 1 2 2 1 2
         2 1 2 2 2 2 2 1 2 1 2 1 2 1 2 2 1 1 1 1 2 1 2 1 1 2 1 1 2 1 1 2 1 1 2 2 1 2 1 1 2 2 1 2 1 1 2 1 1 2
         2 2 1 2 1 1 1 1 2 1 2 2 1 2 2 2 2 2 2 1 1 1 1 2 1 2 2 1 1 2 1 1 2 2 1 1 1 2 2 2 1 2 1 2 2 1 1 2 1 1

    17      PROB OF H2 BURNS IN RB LEADING TO BP

    17:  2 1 2 2 2 2 2 2 2 1 2 2 1 2 2 2 2 2 2 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1 2 2 2 2 1 2 2 2 2 2 2 2 2 1 2
         2 2 2 2 2 2 1 2 2 2 2 2 2 2 1 2 2 2 1 2 2 2 2 2 1 1 1 2 2 2 2 2 2 2 1 2 2 1 2 2 2 2 2 2 2 2 2 2 2 2
         1 2 2 2 2 2 2 2 2 1 2 1 2 2 2 1 1 2 2 1 1 2 2 2 2 1 2 2 1 2 1 1 2 2 1 1 2 2 2 2 1 1 2 2 2 2 2 2 2 2

3    1      IN-VES RELEASE FROM FUEL

3    1:  2 3 2 2 1 2 1 3 2 3 2 2 2 2 2 2 2 2 2 1 3 2 1 2 2 3 2 3 1 1 3 3 1 1 1 2 2 2 4 3 1 3 3 2 2 1 2 2 3 3
         2 2 2 3 1 2 2 3 1 2 1 1 2 3 3 2 2 4 3 2 1 2 3 3 1 1 2 2 2 2 2 3 3 2 3 2 1 4 3 2 1 3 3 2 2 1 2 3 2 2
         2 1 3 1 2 2 1 3 2 2 3 3 2 2 3 2 2 2 3 2 1 3 1 3 2 1 3 1 2 2 3 2 2 2 2 2 2 1 1 3 2 1 1 2 2 1 2 3 1 2

     2      CSI DECOMP

     2:  2 2 3 2 3 4 3 3 2 2 2 1 1 3 2 2 3 2 3 2 2 2 3 2 4 3 3 2 4 2 1 1 1 2 4 1 3 4 3 3 2 3 1 2 4 2 1 3 2 2
         1 1 1 2 3 2 3 3 2 2 2 3 1 2 1 4 2 3 3 3 3 3 2 2 2 2 4 2 1 4 3 3 2 3 4 3 2 4 3 2 2 4 1 3 2 3 3 2 1 3
         1 2 3 2 1 1 2 3 3 2 3 1 1 3 3 1 2 3 2 2 1 1 1 1 2 3 3 3 4 3 2 4 1 3 2 3 2 3 2 2 3 2 3 1 3 1 2 3 2 4

     3      FRAC IN-VES RETENTION LEAKED, AT VB

     3:  1 2 1 2 4 3 1 3 2 2 5 2 2 1 2 3 5 2 4 3 1 2 4 2 2 4 3 2 2 2 2 3 3 3 4 2 4 3 2 2 2 3 3 2 4 3 2 2 4 2
         2 3 4 2 5 4 4 2 1 2 2 3 1 3 2 3 2 2 2 4 3 3 4 4 2 5 2 4 4 4 4 5 3 1 3 2 3 1 1 4 4 2 2 5 3 2 1 2 2 1
         2 3 3 2 2 4 1 2 4 4 2 4 5 2 2 2 2 4 3 2 3 4 2 4 4 3 4 3 4 3 4 3 4 2 3 3 3 2 4 4 3 2 1 3 2 4 2 2 2 3

     4      S POOL DF

     4:  1 3 3 2 1 4 2 4 2 1 2 2 3 2 3 1 4 2 3 4 3 4 2 2 2 1 2 2 2 2 2 2 2 2 2 4 2 2 1 2 5 2 4 2 2 3 2 2 4 2
         2 1 3 4 3 2 1 3 2 2 2 2 2 2 4 2 4 3 2 1 3 3 4 2 2 5 2 2 3 3 2 4 1 3 4 3 1 5 2 2 5 1 2 1 3 2 2 2 5 2
         2 2 1 3 4 2 2 4 2 4 4 3 2 2 2 2 2 2 2 3 2 3 2 3 2 2 4 2 2 4 3 2 2 2 3 3 3 3 4 2 4 3 4 1 2 3 4 2 2 2

     5      S POOL DF, VOL I

     5:  3 4 5 4 4 4 5 3 3 3 2 2 3 4 5 4 3 3 4 4 2 4 5 2 3 4 4 4 2 3 2 4 2 2 3 4 1 2 4 3 2 3 4 3 2 4 3 2 2 5
         4 2 4 3 2 4 4 3 2 3 3 4 3 3 1 4 4 2 1 3 4 2 4 2 4 4 3 4 3 4 3 2 2 3 3 3 1 3 3 5 4 4 3 4 5 3 3 4 2 2
         3 2 5 4 2 2 3 4 3 4 5 5 3 3 2 4 4 2 4 4 5 5 2 4 2 3 2 2 3 2 4 2 4 4 3 5 3 4 3 3 3 5 4 4 3 4 2 3 5 4

     6      REVOL FROM RPV (FRVOL)

     6:  3 3 3 3 4 3 3 2 3 2 3 2 4 3 3 2 3 4 4 2 2 3 3 3 2 2 3 3 3 2 3 4 2 4 3 3 4 1 4 2 3 2 4 3 3 3 2 3 3 3
         2 3 2 3 3 2 2 3 2 2 3 3 4 3 2 4 2 3 2 3 4 3 2 3 4 1 2 3 3 3 3 3 2 2 3 4 3 3 3 3 2 2 3 3 2 2 3 2 4 3
```

```
          2 3 3 3 3 3 2 2 2 3 3 2 2 3 3 4 3 4 2 3 4 1 3 3 2 3 3 2 2 3 4 3 3 3 2 4 3 2 2 3 4 1 4 2 3 2 3 2 3 4

      7     CCI REL

      7:  3 3 3 3 2 2 1 1 1 3 4 3 3 3 2 3 1 2 4 4 4 1 3 3 4 2 2 2 2 3 1 3 3 4 3 3 3 2 3 3 3 3 2 2 3 2 1 4 2 3
          4 4 2 3 1 2 3 4 2 2 2 4 2 2 2 1 2 3 2 2 4 3 2 3 3 3 1 1 3 3 3 2 4 2 1 2 2 3 1 2 2 3 2 1 2 2 4 3 1 2
          2 2 3 2 3 2 1 3 3 2 3 3 3 3 2 3 2 2 2 2 2 2 2 3 2 4 3 3 3 3 2 2 2 2 2 3 2 2 3 2 2 2 3 1 1 2 2 3 3 2

      6     RB DF

      8:  2 3 3 2 2 1 2 2 3 3 2 3 2 1 3 3 2 2 4 3 1 2 2 1 2 2 2 3 2 3 2 1 2 2 2 3 3 3 4 2 2 2 3 3 1 4 3 3 3 3
          2 3 3 3 3 2 1 1 2 2 3 3 2 3 2 1 2 3 2 3 3 1 3 3 1 2 2 3 2 1 2 3 4 3 3 3 2 2 3 2 2 2 2 3 2 4 2 1 2 3
          2 4 1 1 2 2 1 4 2 1 3 3 2 1 4 1 3 4 2 4 1 3 1 2 2 2 3 4 3 2 4 4 2 2 3 3 3 1 2 1 1 1 4 3 3 4 3 2 2 3

      9     REF BAY DF

      9:  3 4 4 2 3 3 3 4 4 2 2 3 1 2 2 3 4 3 3 3 2 3 3 4 4 4 4 3 4 3 4 3 2 3 3 2 3 2 1 3 2 3 3 3 3 4 3 3 3 4
          1 4 4 3 3 3 4 3 4 2 3 4 3 1 4 1 4 4 4 4 4 4 1 3 3 3 3 2 4 1 4 3 4 3 4 4 2 1 4 3 4 2 2 3 4 4 4 4 2 3
          2 4 3 4 1 3 4 2 2 4 4 3 3 3 3 3 3 3 2 4 2 4 4 3 1 3 3 3 4 2 4 2 4 4 2 4 2 2 4 3 4 1 3 4 2 1 3 4 3 4

     10     LATE RELEASE FRACT, IODINE

     10:  3 3 4 2 2 3 1 3 2 2 3 3 1 3 3 1 2 2 3 3 3 3 3 3 2 2 4 4 3 2 3 4 2 2 2 4 3 3 2 3 3 4 1 2 2 3 2 3 3 3
          3 2 3 4 4 3 3 2 3 3 2 3 3 2 3 2 2 2 3 3 2 3 3 3 2 2 2 3 2 3 4 3 3 3 3 3 3 2 3 4 3 2 3 2 4 2 2 3 2 3
          4 2 4 3 3 4 3 2 3 3 3 2 3 4 3 3 2 4 2 4 3 3 3 3 2 3 1 3 2 3 3 3 1 4 3 2 4 1 3 2 2 4 2 2 3 2 2 2 4 3

     11     DUMMY ISSUE

     11:  2 1 1 1 2 1 2 2 2 1 1 2 2 2 1 2 2 2 2 1 2 2 2 1 2 1 1 2 1 2 1 2 1 2 2 1 2 2 1 2 1 2 2 1 1 2 1 1 1 2
          1 2 2 1 1 1 2 1 2 2 1 1 1 2 1 1 2 1 2 1 2 2 1 2 1 2 1 1 2 2 2 1 2 2 1 1 1 2 2 2 2 1 1 1 1 1 1 1 2 2
          1 2 2 2 1 2 2 2 1 1 2 1 2 1 2 1 1 2 1 2 1 1 1 1 1 1 1 2 1 2 2 2 2 2 2 2 2 1 1 1 1 2 2 1 2 1 2 1 1 1

     12     DUMMY ISSUE

     12:  1 2 1 2 3 2 1 2 1 1 2 3 3 3 1 1 3 1 1 1 1 1 1 3 2 3 2 1 2 1 2 1 3 3 1 3 2 2 2 1 2 2 2 2 1 2 1 1 1 1
          2 1 3 3 3 2 3 2 1 3 1 3 3 1 1 2 1 1 2 3 1 3 2 1 3 2 3 1 1 2 1 1 3 3 1 2 1 3 3 2 2 3 2 3 1 2 2 1 3 3
          1 3 2 3 2 3 2 1 1 2 3 3 3 1 1 2 2 3 2 1 2 2 2 3 2 3 2 2 3 3 3 2 2 3 2 2 1 3 3 3 1 2 2 1 3 3 3 3 3 1

     13     DUMMY ISSUE

     13:  2 1 2 4 3 3 2 2 4 2 4 3 3 4 4 1 1 1 1 2 1 1 2 1 1 2 2 3 2 3 1 1 1 1 2 4 4 3 1 4 2 2 4 4 4 3 1 2 1 4
          3 3 2 1 4 2 1 3 3 1 2 4 3 1 4 3 1 1 4 3 2 4 4 3 2 1 4 3 2 3 1 4 1 4 1 1 2 1 3 2 1 3 3 2 3 2 4 1 3 4
          4 1 4 1 4 1 2 2 3 2 4 3 4 3 3 4 3 1 4 3 4 3 1 2 2 4 2 3 4 2 4 2 2 3 2 1 3 3 3 4 3 1 4 4 1 3 2 2 2 3

     14     DUMMY ISSUE

     14:  4 2 3 5 2 2 4 5 5 2 5 2 2 2 1 5 5 1 1 1 3 5 3 5 5 4 4 5 4 1 2 2 2 5 1 3 5 2 1 1 2 4 5 4 3 5 3 3 3 1
          5 3 4 3 5 4 3 3 2 4 5 2 4 2 4 4 4 3 1 5 2 4 2 2 4 1 1 2 1 5 5 3 4 3 1 1 2 5 1 2 3 4 3 5 5 4 3 2 4 2
          5 1 1 3 3 2 2 5 2 5 4 2 1 1 3 4 3 1 1 2 1 1 3 5 1 3 2 1 5 3 4 3 3 1 4 5 4 1 4 2 1 3 4 4 3 5 3 4 1 4

  4   1     DUMMY ISSUE

  4   1:  4 2 5 7 6 2 4 3 5 7 6 1 3 8 3 7 2 7 1 8 5 5 3 8 3 7 2 2 4 4 1 3 3 7 3 1 3 6 4 1 4 8 5 2 1 5 4 5 8 8
          2 2 5 4 1 3 1 6 5 5 6 3 3 8 8 6 7 2 1 3 8 8 1 8 4 5 6 4 7 2 1 5 5 4 4 3 2 7 6 7 1 4 5 3 4 6 7 3 1 8
          5 7 2 2 6 7 6 1 8 8 4 3 4 5 5 6 7 2 1 1 3 6 1 6 1 5 6 7 6 6 2 4 4 6 8 2 8 8 6 4 7 2 1 5 7 8 2 3 7 8
```

```
1     BASE CASE:  PEACH BOTTOM LLH (M
      Specific information concerning input data follows :
      HEADER : CONS. BY MACCS SEQ BY TEMAC, ST BY RELTRAC

      SEQUENCES : P.B. SEQ. FREQS. FOR LALH: 1=TB,2=TBUX,3=TBU,4=TCSX,5=TCUX,6=TCSRX2,7=TCSRV23
      CONTAINMENT FAILURE MODES : PEACH BOTTOM LLH - BASE & S.O. MASTER KEEP BINFILE - 3 DEC 86
      RELEASES :  PEACH BOTTOM EXPANDED CLUSTER ASSIGNMENT FILE

      CONSEQUENCES : CONSEQUENCES BY MACCS 11/14/86

1     MEAN CFM PROBABILITIES FOR EACH CFG

      ICFG =  1
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
```

```
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0001 0.0001 0.0004 0.0001    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0002 0.0004 0.0003 0.0004 0.0004    0.0002 0.0001 0.0001 0.0002 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0001
0.0005 0.0006 0.0004 0.0004 0.0004    0.0008 0.0004 0.0008 0.0000 0.0000
0.0001 0.0001 0.0004 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0004    0.0002 0.0003 0.0004 0.0004 0.0002
0.0001 0.0001 0.0002 0.0000 0.0002    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0004 0.0002 0.0004 0.0004 0.0002
0.0003 0.0001 0.0008 0.0002 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0003 0.0002 0.0001 0.0003 0.0002    0.0002 0.0003 0.0000 0.0001 0.0001
0.0001 0.0002 0.0000 0.0006 0.0000    0.0000 0.0029 0.0014 0.0001 0.0010
0.0067 0.0012 0.0007 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0044 0.0001 0.0023 0.0009 0.0009
0.0001 0.0068 0.0006 0.0015 0.0003    0.0049 0.0033 0.0001 0.0000 0.0001
0.0002 0.0000 0.0000 0.0000 0.0017    0.0002 0.0003 0.0018 0.0002 0.0027
0.0019 0.0003 0.0126 0.0007 0.0046    0.0000 0.0042 0.0005 0.0004 0.0001
0.0001 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0006 0.0003 0.0000 0.0000 0.0006    0.0007 0.0004 0.0000 0.0014 0.0007
0.0000 0.0000 0.0000 0.0000 0.0008    0.0000 0.0000 0.0002 0.0005 0.0000
0.0000 0.0000 0.0011 0.0000 0.0000    0.0004 0.0007 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0009 0.0002 0.0017
0.0000 0.0003 0.0006 0.0001 0.0004    0.0001 0.0000 0.0005 0.0000 0.0007
0.0000 0.0010 0.0000 0.0000 0.0000    0.0000 0.0001 0.0005 0.0025 0.0001
0.0000 0.0000 0.0000 0.0000 0.0000    0.0001 0.0010 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0006 0.0037 0.0001
0.0029 0.0178 0.0018 0.0059 0.0064    0.0118 0.0005 0.0087 0.0002 0.0040
0.0000 0.0067 0.0204 0.0077 0.0032    0.0214 0.0012 0.0057 0.0005 0.0040
0.0000 0.0012 0.0026 0.0037 0.0016    0.0002 0.0000 0.0001 0.0002 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0020
0.0033 0.0035 0.0041 0.0002 0.0024    0.0035 0.0041 0.0034 0.0061 0.0041
```

```
0.0004 0.0016 0.0001 0.0016 0.0030
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0040 0.0000 0.0010
0.0003 0.0003 0.0064 0.0018 0.0000
0.0001 0.0000 0.0009 0.0000 0.0000
0.0000 0.0029 0.0000 0.0010 0.0000
0.0000 0.0009 0.0000 0.0113 0.0000
0.0000 0.0115 0.0015 0.0073 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0004 0.0001 0.0000 0.0000
0.0000 0.0000 0.0100 0.0019 0.0000
0.0025 0.0002 0.0000 0.0000 0.0012
0.0000 0.0000 0.0034 0.0010 0.0000
0.0016 0.0001 0.0000 0.0000 0.0216
0.0000 0.0002 0.0000 0.0000 0.0027
0.0089 0.0014 0.0000 0.0000 0.0040
0.0000 0.0000 0.0026 0.0000 0.0005
0.0859 0.0000 0.0172 0.0006 0.0250
```

```
0.0000 0.0000 0.0001 0.0000 0.0007
0.0000 0.0000 0.0000 0.0000 0.0000
0.0038 0.0009 0.0001 0.0055 0.0006
0.0000 0.0000 0.0000 0.0006 0.0004
0.0000 0.0000 0.0000 0.0000 0.0002
0.0085 0.0000 0.0041 0.0000 0.0025
0.0034 0.0000 0.0002 0.0000 0.0026
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0038 0.0003 0.0000 0.0010 0.0000
0.0000 0.0045 0.0010 0.0000 0.0000
0.0002 0.0000 0.0000 0.0128 0.0031
0.0000 0.0043 0.0002 0.0000 0.0000
0.0027 0.0000 0.0000 0.0051 0.0008
0.0001 0.0000 0.0004 0.0000 0.0000
0.0010 0.0000 0.0001 0.0000 0.0000
0.0000 0.0175 0.0000 0.0043 0.0000
0.1315
```

```
    ICFG =  2
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
```

```
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
```

```
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0005 0.0002    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0014
0.0005 0.0016 0.0049 0.0012 0.0005    0.0000 0.0002 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0001    0.0031 0.0015 0.0014 0.0037 0.0022
0.0002 0.0000 0.0005 0.0002 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0002 0.0001 0.0014    0.0005 0.0016 0.0000 0.0049 0.0001
0.0012 0.0001 0.0005 0.0001 0.0000    0.0000 0.0001 0.0002 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0001 0.0025 0.0013 0.0014
0.0026 0.0017 0.0002 0.0002 0.0000    0.0000 0.0000 0.0000 0.0005 0.0001
0.0012 0.0005 0.0000 0.0000 0.0002    0.0000 0.0002 0.0000 0.0014 0.0004
0.0000 0.0135 0.0000 0.0044 0.0001    0.0000 0.0000 0.0007 0.0002 0.0000
0.0000 0.0000 0.0004 0.0004 0.0005    0.0001 0.0001 0.0000 0.0002 0.0014
0.0009 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0058 0.0008 0.0060 0.0256 0.0012    0.0026 0.0002 0.0010 0.0002 0.0005
0.0000 0.0006 0.0012 0.0005 0.0002    0.0000 0.0000 0.0000 0.0000 0.0000
0.0101 0.0013 0.0149 0.0003 0.0114    0.0013 0.0047 0.0005 0.0018 0.0002
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0002 0.0000
0.0000 0.0000 0.0001 0.0007 0.0000    0.0000 0.0011 0.0000 0.0000 0.0000
0.0002 0.0005 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0029
0.0011 0.0008 0.0064 0.0003 0.0001    0.0001 0.0000 0.0000 0.0013 0.0002
0.0000 0.0010 0.0000 0.0015 0.0000    0.0000 0.0000 0.0000 0.0000 0.0004
0.0002 0.0025 0.0016 0.0003 0.0000    0.0000 0.0000 0.0000 0.0004 0.0015
0.0003 0.0002 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0205 0.0000 0.0928
0.0319 0.0003 0.0230 0.0009 0.0658    0.0038 0.0311 0.0010 0.0155 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0119 0.0195 0.0224 0.0184 0.0005    0.0094 0.0007 0.0064 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0012    0.0011 0.0005 0.0002 0.0000 0.0005
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0057 0.0008 0.0057 0.0002 0.0145    0.0006 0.0026 0.0005 0.0010 0.0004
0.0000 0.0000 0.0000 0.0000 0.0000    0.0038 0.0001 0.0008 0.0001 0.0004
0.0000 0.0000 0.0000 0.0000 0.0000    0.0004 0.0011 0.0002 0.0002 0.0006
0.0008 0.0001 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0011 0.0011    0.0000 0.0045 0.0001 0.0053 0.0001
0.0000 0.0000 0.0003 0.0003 0.0000    0.0001 0.0000 0.0000 0.0038 0.0047
0.0000 0.0000 0.0000 0.0009 0.0009    0.0000 0.0000 0.0000 0.0000 0.0001
0.0000 0.0001 0.0003 0.0085 0.0350    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
```

128

```
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 1.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000

    ICFG =  3
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
```

```
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0045 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0084 0.0341 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0149 0.0109     0.0828 0.0740 0.0000 0.0000 0.0000
0.0000 0.0323 0.0281 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0042 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
```

```
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000

   ICFG =  4
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0085 0.0000 0.0000 0.0055 0.0001      0.0000 0.0394 0.0000 0.0000 0.0099
0.0000 0.0000 0.0000 0.0079 0.0000      0.0000 0.0051 0.0000 0.0000 0.0118
0.0001 0.0000 0.0041 0.0000 0.0000      0.0002 0.0000 0.0000 0.0001 0.0000
0.0007 0.0000 0.0003 0.0000 0.0714      0.0000 0.0000 0.0000 0.0259 0.0001
0.0000 0.0256 0.0000 0.0000 0.0099      0.0000 0.0000 0.0000 0.0000 0.0000
0.0512 0.0001 0.0000 0.0091 0.0000      0.0000 0.0428 0.0001 0.0000 0.0041
0.0000 0.0000 0.0001 0.0000 0.0002      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0023 0.0000 0.0000 0.0000      0.0000 0.0005 0.0000 0.0002 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0006 0.0000 0.0000
0.0001 0.0000 0.0000 0.0000 0.0002      0.0000 0.0002 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0001 0.0000 0.0000 0.0002
0.0000 0.0000 0.0001 0.0000 0.0002      0.0000 0.0000 0.0004 0.0000 0.0000
0.0002 0.0000 0.0000 0.0001 0.0005      0.0000 0.0001 0.0000 0.0000 0.0000
0.0000 0.0000 0.0002 0.0001 0.0000      0.0000 0.0000 0.0001 0.0000 0.0000
0.0000 0.0000 0.0002 0.0001 0.0000      0.0000 0.0000 0.0000 0.0004 0.0002
0.0000 0.0000 0.0000 0.0000 0.0011      0.0003 0.0000 0.0017 0.0000 0.0000
0.0001 0.0000 0.0000 0.0010 0.0000      0.0000 0.0000 0.0000 0.0000 0.0001
0.0000 0.0003 0.0001 0.0000 0.0000      0.0007 0.0000 0.0000 0.0000 0.0008
0.0000 0.0000 0.0000 0.0001 0.0000      0.0004 0.0000 0.0007 0.0000 0.0018
0.0000 0.0025 0.0021 0.3134 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
```

```
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
```

```
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000

   ICFG =  5
0.0010 0.0000 0.0019 0.0024 0.0000       0.0000 0.0001 0.0001 0.0076 0.0072
0.0000 0.0000 0.0000 0.0016 0.0208       0.0353 0.0001 0.0010 0.0000 0.0019
0.0024 0.0000 0.0000 0.0000 0.0001       0.0001 0.0076 0.0120 0.0000 0.0000
0.0000 0.0000 0.0000 0.0176 0.0328       0.0480 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0031 0.0236       0.0263 0.0000 0.0000 0.0002 0.0002
0.0005 0.0005 0.0011 0.0003 0.0011       0.0003 0.0000 0.0000 0.0000 0.0000
0.0013 0.0002 0.0006 0.0002 0.0000       0.0000 0.0000 0.0000 0.0547 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000       0.0000 0.0000 0.0000 0.0000 0.0000
```

```
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000 0.0000 0.0000 0.0000 0.0000
```

```
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000

  ICFG =  6
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0022 0.0018 0.0006
0.0000 0.0002 0.0000 0.0000 0.0015
0.0000 0.0010 0.0032 0.0000 0.0000
0.0033 0.0030 0.0000 0.0000 0.0000
0.0000 0.0000 0.0001 0.0021 0.0017
0.0000 0.0001 0.0001 0.0000 0.0000
0.0014 0.0016 0.0003 0.0004 0.0001
0.0001 0.0006 0.0000 0.0005 0.0017
0.0000 0.0000 0.0000 0.0000 0.0003
0.0004 0.0005 0.0000 0.0000 0.0000
0.0018 0.0017 0.0000 0.0000 0.0003

0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0001
0.0002 0.0000 0.0000 0.0000 0.0000
0.0028 0.0007 0.0004 0.0001 0.0006
0.0000 0.0001 0.0000 0.0003 0.0006
0.0000 0.0000 0.0000 0.0000 0.0000
0.0006 0.0002 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0002 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0006 0.0000 0.0000 0.0000 0.0000
0.0005 0.0006 0.0000 0.0000 0.0003
0.0001 0.0000 0.0001 0.0003 0.0000
0.0000 0.0019 0.0022 0.0000 0.0000
```

```
0.0001 0.0001 0.0000 0.0000 0.0000    0.0003 0.0004 0.0000 0.0001 0.0000
0.0000 0.0000 0.0000 0.0001 0.0001    0.0000 0.0001 0.0002 0.0002 0.0000
0.0000 0.0001 0.0001 0.0000 0.0000    0.0000 0.0394 0.0002 0.0000 0.0056
0.0000 0.0000 0.0000 0.0192 0.0003    0.0000 0.0000 0.0133 0.0001 0.0000
0.0000 0.0000 0.0000 0.0367 0.0001    0.0000 0.0000 0.0090 0.0001 0.0000
0.0001 0.0000 0.0001 0.0000 0.0000    0.0650 0.0002 0.0000 0.0000 0.0184
0.0002 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0001 0.0001    0.0002 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0001 0.0000 0.0000    0.0000 0.0000 0.0000 0.0003 0.0005
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0001 0.0003 0.0003 0.0000 0.0000    0.0000 0.0000 0.0129 0.0002 0.0000
0.0056 0.0000 0.0000 0.0000 0.0000    0.0273 0.0003 0.0000 0.0000 0.0000
0.0000 0.0136 0.0001 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0367 0.0001 0.0000 0.0000 0.0000    0.0090 0.0001 0.0000 0.0001 0.0000
0.0001 0.0000 0.0000 0.0559 0.0002    0.0000 0.0000 0.0042 0.0002 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0001 0.0001 0.0002 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0001    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0004    0.0027 0.0000 0.0001 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0001 0.0004
0.0000 0.0009 0.0000 0.0005 0.0000    0.0000 0.0008 0.0000 0.0003 0.0000
0.0000 0.0000 0.0000 0.0000 0.0006    0.0000 0.0006 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0001 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000 0.0000 0.0000 0.0000 0.0000
```

```
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000

    ICFG =  7
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
```

```
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0044
0.0000 0.0225 0.0000 0.0323 0.0000      0.0101 0.0000 0.0480 0.0000 0.0065
0.0000 0.0000 0.0863 0.0004 0.0000      0.0221 0.0000 0.0243 0.0000 0.0083
0.0000 0.0312 0.0000 0.0029 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
```

```
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
```

```
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
0.0000
```

```
      RESULTS ARE ABSOLUTE RISK PER YEAR

      BASE CASE OUTPUT WILL BE PRINTED
1      SORTED MELTDOWN FREQUENCIES
             PROBABILITY          CUM. PROB          FREQUENCY
              6.667E-03           6.667E-03          8.222E-07
              6.667E-03           1.333E-02          8.242E-07
              6.667E-03           2.000E-02          9.747E-07
              6.667E-03           2.667E-02          1.027E-06
              6.667E-03           3.333E-02          1.252E-06
              6.667E-03           4.000E-02          1.254E-06
              6.667E-03           4.667E-02          1.270E-06
              6.667E-03           5.333E-02          1.285E-06
              6.667E-03           6.000E-02          1.301E-06
              6.667E-03           6.667E-02          1.301E-06
              6.667E-03           7.333E-02          1.301E-06
              6.667E-03           8.000E-02          1.301E-06
              6.667E-03           8.667E-02          1.301E-06
              6.667E-03           9.333E-02          1.303E-06
              6.667E-03           1.000E-01          1.303E-06
              6.667E-03           1.067E-01          1.417E-06
              6.667E-03           1.133E-01          1.434E-06
              6.667E-03           1.200E-01          1.469E-06
              6.667E-03           1.267E-01          1.483E-06
              6.667E-03           1.333E-01          1.483E-06
              6.667E-03           1.400E-01          1.499E-06
              6.667E-03           1.467E-01          1.506E-06
              6.667E-03           1.533E-01          1.598E-06
              6.667E-03           1.600E-01          1.628E-06
              6.667E-03           1.667E-01          1.693E-06
              6.667E-03           1.733E-01          1.804E-06
              6.667E-03           1.800E-01          1.969E-06
              6.667E-03           1.867E-01          2.073E-06
              6.667E-03           1.933E-01          2.073E-06
              6.667E-03           2.000E-01          2.107E-06
              6.667E-03           2.067E-01          2.107E-06
              6.667E-03           2.133E-01          2.110E-06
              6.667E-03           2.200E-01          2.112E-06
              6.667E-03           2.267E-01          2.113E-06
              6.667E-03           2.333E-01          2.131E-06
              6.667E-03           2.400E-01          2.141E-06
              6.667E-03           2.467E-01          2.145E-06
              6.667E-03           2.533E-01          2.147E-06
              6.667E-03           2.600E-01          2.172E-06
              6.667E-03           2.667E-01          2.172E-06
              6.667E-03           2.733E-01          2.200E-06
              6.667E-03           2.800E-01          2.274E-06
              6.667E-03           2.867E-01          2.327E-06
              6.667E-03           2.933E-01          2.330E-06
              6.667E-03           3.000E-01          2.343E-06
              6.667E-03           3.067E-01          2.343E-06
              6.667E-03           3.133E-01          2.347E-06
              6.667E-03           3.200E-01          2.347E-06
              6.667E-03           3.267E-01          2.350E-06
              6.667E-03           3.333E-01          2.350E-06
              6.667E-03           3.400E-01          2.350E-06
              6.667E-03           3.467E-01          2.350E-06
              6.667E-03           3.533E-01          2.813E-06
              6.667E-03           3.600E-01          2.813E-06
              6.667E-03           3.667E-01          2.951E-06
              6.667E-03           3.733E-01          2.951E-06
              6.667E-03           3.800E-01          3.004E-06
              6.667E-03           3.867E-01          3.016E-06
              6.667E-03           3.933E-01          3.016E-06
              6.667E-03           4.000E-01          3.016E-06
              6.667E-03           4.067E-01          3.016E-06
              6.667E-03           4.133E-01          3.017E-06
              6.667E-03           4.200E-01          3.033E-06
              6.667E-03           4.267E-01          3.039E-06
              6.667E-03           4.333E-01          3.044E-06
              6.667E-03           4.400E-01          3.094E-06
              6.667E-03           4.467E-01          3.094E-06
              6.667E-03           4.533E-01          3.216E-06
              6.667E-03           4.600E-01          3.230E-06
              6.667E-03           4.667E-01          3.236E-06
              6.667E-03           4.733E-01          3.785E-06
              6.667E-03           4.800E-01          3.799E-06
              6.667E-03           4.867E-01          3.799E-06
              6.667E-03           4.933E-01          3.799E-06
              6.667E-03           5.000E-01          3.801E-06
              6.667E-03           5.067E-01          3.802E-06
              6.667E-03           5.133E-01          3.866E-06
              6.667E-03           5.200E-01          3.898E-06
              6.667E-03           5.267E-01          3.898E-06
              6.667E-03           5.333E-01          3.899E-06
              6.667E-03           5.400E-01          3.901E-06
```

```
        6.667E-03           5.467E-01           3.932E-06
        6.667E-03           5.533E-01           3.967E-06
        6.667E-03           5.600E-01           3.981E-06
        6.667E-03           5.667E-01           3.981E-06
        6.667E-03           5.733E-01           3.981E-06
        6.667E-03           5.800E-01           3.981E-06
        6.667E-03           5.867E-01           3.984E-06
        6.667E-03           5.933E-01           3.997E-06
        6.667E-03           6.000E-01           3.997E-06
        6.667E-03           6.067E-01           4.001E-06
        6.667E-03           6.133E-01           4.004E-06
        6.667E-03           6.200E-01           4.006E-06
        6.667E-03           6.267E-01           4.031E-06
        6.667E-03           6.333E-01           4.031E-06
        6.667E-03           6.400E-01           4.068E-06
        6.667E-03           6.467E-01           4.103E-06
        6.667E-03           6.533E-01           4.467E-06
        6.667E-03           6.600E-01           4.605E-06
        6.667E-03           6.667E-01           4.605E-06
        6.667E-03           6.733E-01           4.605E-06
        6.667E-03           6.800E-01           4.670E-06
        6.667E-03           6.867E-01           4.693E-06
        6.667E-03           6.933E-01           4.772E-06
        6.667E-03           7.000E-01           4.772E-06
        6.667E-03           7.067E-01           4.782E-06
        6.667E-03           7.133E-01           4.783E-06
        6.667E-03           7.200E-01           4.793E-06
        6.667E-03           7.267E-01           4.793E-06
        6.667E-03           7.333E-01           4.797E-06
        6.667E-03           7.400E-01           4.797E-06
        6.667E-03           7.467E-01           4.797E-06
        6.667E-03           7.533E-01           4.799E-06
        6.667E-03           7.600E-01           4.800E-06
        6.667E-03           7.667E-01           4.938E-06
        6.667E-03           7.733E-01           4.979E-06
        6.667E-03           7.800E-01           4.995E-06
        6.667E-03           7.867E-01           4.995E-06
        6.667E-03           7.933E-01           4.999E-06
        6.667E-03           8.000E-01           4.999E-06
        6.667E-03           8.067E-01           4.999E-06
        6.667E-03           8.133E-01           4.999E-06
        6.667E-03           8.200E-01           5.002E-06
        6.667E-03           8.267E-01           5.002E-06
        6.667E-03           8.333E-01           5.006E-06
        6.667E-03           8.400E-01           5.603E-06
        6.667E-03           8.467E-01           5.603E-06
        6.667E-03           8.533E-01           5.691E-06
        6.667E-03           8.600E-01           5.770E-06
        6.667E-03           8.667E-01           5.770E-06
        6.667E-03           8.733E-01           6.552E-06
        6.667E-03           8.800E-01           6.553E-06
        6.667E-03           8.867E-01           6.749E-06
        6.667E-03           8.933E-01           7.206E-06
        6.667E-03           9.000E-01           7.305E-06
        6.667E-03           9.067E-01           3.175E-05
        6.667E-03           9.133E-01           3.517E-05
        6.667E-03           9.200E-01           3.630E-05
        6.667E-03           9.267E-01           3.648E-05
        6.667E-03           9.333E-01           3.650E-05
        6.667E-03           9.400E-01           3.650E-05
        6.667E-03           9.467E-01           3.727E-05
        6.667E-03           9.533E-01           3.929E-05
        6.667E-03           9.600E-01           3.929E-05
        6.667E-03           9.667E-01           3.929E-05
        6.667E-03           9.733E-01           3.949E-05
        6.667E-03           9.800E-01           4.019E-05
        6.667E-03           9.867E-01           4.105E-05
        6.667E-03           9.933E-01           4.125E-05
        6.667E-03           1.000E+00           4.185E-05

MEAN =    6.820E-06     VARIANCE =     1.123E-10

PERCENTILES :
    5-TH =     1.278E-06  50-TH =     3.801E-06  95-TH =     3.827E-05
```

```
CONSEQUENCE MEASURE:
 EARLY FATALITIES


 BASE CASE :
  PEACH BOTTOM LLH (MACCS)

 ISSUE LEVELS FOR EACH SAMPLE MEMBER, IN ORDER OF INCREASING RISK
        RISK  ISSUE LEVELS, FOR ALL ISSUES
             1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24  25  26  27  28  29  30  31  32
6.101E-10    3   2   3   2   3   2   4   3   1   1   8   3   1   2   2   3   4   2   2   2   1   2   2   2   4   2   2   2   2   2   1   2
1.622E-09    2   2   2   1   1   2   3   3   4   1   6   3   2   2   2   1   2   1   2   2   2   2   2   2   2   2   4   3   3   2   2   2
3.038E-09    3   2   2   1   3   3   3   2   3   1   5   3   2   2   2   1   2   3   2   2   2   2   2   1   4   2   4   3   2   2   4   1
5.940E-09    2   1   2   2   1   4   1   3   3   1   3   3   1   2   2   2   2   2   2   1   2   2   1   2   2   3   4   3   2   1   4   3
7.073E-09    3   1   3   2   4   2   1   3   3   1   7   3   2   2   2   1   3   1   2   1   1   2   2   2   2   2   3   4   2   2   3   2
7.111E-09    2   3   1   1   3   3   3   4   3   2   5   2   2   1   2   3   3   2   1   2   2   2   3   2   4   2   3   3   2   1   3   2
7.955E-09    3   3   3   1   1   1   2   2   3   1   4   3   2   1   2   2   2   2   2   1   2   2   3   1   2   2   2   3   1   2   4   3
8.482E-09    2   2   3   1   1   3   2   3   2   1   6   2   2   2   1   3   5   2   1   1   1   2   2   3   5   4   3   3   1   2   4   2
8.664E-09    2   2   2   2   2   2   3   3   3   1   8   2   2   1   1   2   2   1   2   2   1   2   1   2   1   2   3   2   1   1   4   3
8.686E-09    3   3   2   2   3   3   3   1   1   1   9   3   2   1   1   1   3   2   2   1   2   2   1   3   2   3   4   2   2   1   2   1
9.583E-09    3   3   2   1   1   2   3   3   2   1   6   2   2   1   2   2   2   2   2   2   2   2   2   4   3   2   4   4   1   1   1   2
1.087E-08    3   2   3   2   1   2   3   2   2   1   7   2   2   2   1   3   1   2   2   1   1   1   3   3   2   2   1   2   2   2   4   3
1.099E-08    2   2   2   1   2   2   2   3   3   1   9   2   2   2   1   2   4   2   2   2   2   2   1   2   4   5   4   2   2   2   4   3
1.207E-08    3   3   1   1   1   2   3   4   3   1   6   2   2   2   2   2   1   2   2   2   2   2   2   3   4   2   3   2   3   2   2   3
1.508E-08    2   2   2   1   4   2   2   3   2   1   7   3   2   1   2   1   1   2   2   2   1   2   2   3   4   2   3   3   3   2   4   4
1.729E-08    1   3   3   1   2   3   2   1   3   1   6   2   2   2   2   3   5   3   2   1   1   2   2   4   4   3   4   3   3   1   1   3
1.967E-08    2   2   2   2   2   2   2   2   3   1   6   2   2   1   1   1   1   1   2   2   1   2   2   1   2   4   2   3   3   2   1   3
2.096E-08    1   3   3   2   1   3   2   2   3   2   3   2   2   1   2   3   3   1   1   1   2   2   2   4   4   2   2   3   3   1   3   2
2.189E-08    2   3   3   1   1   3   2   3   3   2   7   2   2   2   1   2   2   2   2   2   1   2   2   3   4   1   3   3   2   3   4   3
2.332E-08    1   3   2   1   3   3   4   2   3   1   3   3   2   1   2   2   2   3   2   2   2   2   2   1   2   2   3   2   1   3   3   2
2.530E-08    2   1   3   2   2   4   3   2   2   1   7   2   2   1   2   1   3   1   1   1   2   1   3   1   2   4   1   2   2   2   4   3
3.220E-08    2   3   2   1   2   4   3   2   3   2   6   2   2   1   1   2   1   1   2   1   2   2   1   3   4   1   4   4   2   2   3   2
3.581E-08    3   3   1   1   2   3   4   3   3   1   3   3   2   2   1   2   2   1   1   2   1   2   2   2   2   2   2   3   3   1   4   3
4.084E-08    2   3   2   2   3   2   2   2   2   1   4   1   2   2   2   1   3   2   2   1   1   2   2   1   4   2   2   3   2   2   3   4
4.320E-08    3   3   2   1   2   2   2   3   2   1   6   2   2   1   2   2   1   1   2   1   2   2   1   2   2   2   3   3   2   3   3   2
4.587E-08    3   2   3   1   1   3   3   4   2   1   5   3   2   1   1   2   3   2   1   2   1   2   3   3   1   2   3   3   1   3   4   3
4.652E-08    4   2   3   2   2   3   3   1   2   2   7   2   2   2   1   2   1   2   2   2   1   2   2   3   3   3   2   3   3   1   4   3
4.837E-08    2   3   3   2   2   2   2   2   2   1   2   3 [illegible] 1   2   3   2   2   2   2   2   2   2   2   5   2   2   3   4   2   2   3
4.880E-08    2   2   2   1   2   4   3   3   2   1   8   2   2   2   2   3   2   1   2   2   1   2   3   1   3   2   4   4   3   1   3   4
5.021E-08    3   2   1   1   2   2   3   2   1   1   1   3   2   1   1   1   2   1   1   2   1   2   2   6   3   4   4   3   2   1   3   3
5.265E-08    2   2   3   2   2   3   3   4   4   1   6   2   2   2   1   1   2   2   2   2   2   2   2   3   2   2   3   3   3   1   3   4
5.286E-08    4   3   3   1   3   2   3   1   3   2   6   3   2   2   2   3   3   1   2   2   2   2   1   1   3   2   2   2   3   2   2   2
5.713E-08    2   2   2   1   3   4   3   2   2   1   6   3   2   2   2   3   5   2   1   1   2   2   1   4   2   2   2   3   2   2   4   3
5.839E-08    2   1   4   1   3   2   3   1   3   1   6   2   2   2   2   2   2   3   1   2   2   2   2   3   2   2   3   3   1   3   2   3
6.251E-08    2   2   3   2   3   4   2   3   3   1   6   2   2   1   2   4   1   2   2   2   1   1   2   4   2   2   3   2   1   2   3   2
6.613E-08    3   2   3   1   3   4   3   2   2   2   8   2   2   1   2   2   2   1   2   1   2   2   1   3   5   3   2   3   1   3   3   4
6.654E-08    3   2   2   1   3   2   3   3   4   1   7   2   1   1   1   2   3   2   2   2   2   2   3   3   4   4   2   3   3   3   3   1
6.856E-08    2   2   4   1   4   2   3   3   3   1   6   2   2   2   1   3   2   2   2   2   1   2   1   1   2   2   2   3   2   1   4   3
6.910E-08    4   3   3   1   2   3   3   3   2   1   6   2   2   1   2   2   2   1   2   1   2   2   2   3   3   4   2   3   3   2   2   3
6.912E-08    3   2   3   1   2   2   3   3   4   1   6   2   2   2   1   4   4   2   2   1   2   2   3   3   3   2   3   2   3   2   3   4
7.004E-08    1   1   3   2   2   3   4   2   2   1   2   2   2   2   2   1   3   2   1   2   1   1   2   2   3   3   3   2   2   3   2   3
7.122E-08    2   2   3   2   2   3   4   2   2   1   9   3   2   2   1   3   3   2   1   1   1   2   1   1   4   3   4   2   2   4   1   2
7.285E-08    2   1   3   2   2   1   2   3   4   1   5   2   2   2   1   2   2   3   1   2   2   2   2   3   1   2   3   3   4   2   4   2
7.425E-08    1   1   3   1   2   3   4   2   2   1   3   3   2   1   2   2   2   1   1   2   1   2   2   1   2   2   2   2   3   3   3   3
7.482E-08    3   4   2   2   4   3   2   3   2   1   5   2   2   2   2   2   4   2   2   1   2   2   3   3   2   2   3   2   3   2   4   2
7.804E-08    3   1   2   1   2   3   1   4   2   1   2   2   2   1   1   2   3   2   2   1   2   1   2   1   2   2   3   2   2   2   2   4
8.762E-08    3   3   2   1   3   3   1   1   4   1   5   3   2   1   2   2   3   1   2   2   2   2   2   3   1   2   4   3   3   1   2   3
8.859E-08    2   2   2   2   2   1   3   3   2   1   6   3   2   2   2   2   2   2   1   2   2   2   2   2   4   2   4   2   2   2   3   3
9.414E-08    4   3   3   2   2   3   3   1   2   1   4   2   1   1   2   2   5   1   2   2   1   2   3   2   2   2   4   2   3   1   4   3
9.613E-08    2   3   3   1   4   2   2   3   3   1   6   2   2   2   1   2   4   2   1   1   1   2   3   3   3   4   3   2   1   2   4   3
1.084E-07    3   2   2   1   2   4   2   3   3   1   8   3   2   1   2   2   1   1   1   2   2   2   3   1   4   3   4   3   3   2   3   3
1.108E-07    2   3   2   1   2   1   2   3   1   1   5   3   2   2   1   2   1   1   2   2   1   2   2   1   2   5   2   4   1   2   2   2
1.183E-07    3   3   2   1   2   1   2   3   3   1   2   2   2   2   2   2   3   2   2   1   1   2   1   2   3   3   4   3   2   4   4   3
1.230E-07    3   3   1   2   2   3   2   2   1   1   6   1   1   1   1   4   3   2   2   2   2   2   2   1   3   1   4   2   1   3   4   2
1.248E-07    3   3   4   2   2   3   2   3   2   1   7   2   1   1   1   2   1   2   2   1   1   2   2   4   3   2   2   1   2   3   2   3
1.255E-07    3   1   2   2   1   2   1   2   1   1   8   3   2   1   2   3   4   2   2   2   1   2   3   2   3   1   2   2   4   4   4   3
1.303E-07    2   4   3   1   4   2   2   2   3   2   7   3   2   2   1   2   1   2   2   1   2   2   3   2   1   3   2   2   4   1   2   3
1.330E-07    2   1   2   2   3   3   2   1   2   2   6   2   2   1   1   2   3   1   2   2   2   2   2   2   3   1   4   2   3   3   3   1
1.478E-07    2   3   3   1   3   3   2   1   1   1   7   2   2   1   1   2   2   2   2   2   2   2   2   2   1   1   3   3   3   2   3   3
1.493E-07    2   3   3   2   2   3   2   2   4   2   9   2   2   1   1   3   2   2   1   1   2   2   2   1   1   2   3   4   2   2   3   3
1.501E-07    2   3   2   1   2   2   3   2   4   1   7   2   2   1   2   3   3   1   1   2   1   2   1   2   3   1   1   3   2   2   2   3
1.545E-07    2   3   2   1   2   2   1   3   1   1   4   2   2   1   2   2   3   2   1   2   2   2   1   2   1   2   2   2   2   2   4   3
1.583E-07    2   3   1   2   3   3   2   3   2   1   4   2   2   2   1   2   2   2   2   1   1   2   3   3   2   3   3   3   4   1   3   2
1.606E-07    3   2   3   1   3   3   2   2   2   1   7   3   2   1   2   3   4   3   1   1   1   2   2   2   2   3   5   3   2   3   2   3
1.615E-07    1   2   2   1   2   2   3   3   3   1   5   2   2   2   1   2   4   1   2   1   2   1   4   4   1   5   3   3   3   2   1   2
1.686E-07    3   2   1   2   3   3   3   3   3   2   5   2   2   1   1   2   5   2   2   2   1   2   2   2   2   2   3   2   2   2   2   3
1.800E-07    3   2   2   1   3   1   2   2   2   1   9   2   2   2   1   3   1   3   2   1   2   2   2   3   2   3   3   4   2   3   4   3
1.842E-07    3   2   3   2   2   2   3   2   1   1   5   3   2   2   1   2   2   2   2   2   1   1   2   2   4   4   4   3   2   1   4   3
1.904E-07    2   3   4   2   2   3   1   2   3   1   6   3   2   2   2   2   2   1   1   2   1   2   2   4   2   2   3   2   4   2   4   2
1.959E-07    3   2   3   1   3   3   4   4   3   1   7   2   2   2   1   3   2   1   1   1   1   2   4   3   2   3   2   3   3   3   4   2
1.984E-07    1   3   2   1   2   2   2   3   2   1   8   2   2   1   1   2   2   1   2   2   1   2   3   2   3   2   3   3   2   3   1   2
2.033E-07    3   3   2   2   2   2   3   3   3   2   6   2   1   2   2   3   2   1   1   1   1   2   2   3   1   3   3   2   2   3   3   3
2.135E-07    3   3   3   2   2   3   3   3   2   1   6   2   1   2   1   2   4   3   2   1   1   1   2   3   3   4   3   4   2   1   4   2
2.145E-07    3   1   2   1   2   3   2   2   2   2   5   2   2   1   2   2   3   2   2   1   2   2   3   2   2   4   3   3   3   3   3   4
2.275E-07    3   3   4   2   2   1   2   3   3   1   4   2   2   2   2   3   5   2   1   2   2   2   2   3   2   2   4   3   2   2   4   4
2.285E-07    3   2   4   1   3   3   3   2   3   2   2   2   2   2   1   3   3   1   2   2   1   2   3   1   4   3   5   1   2   3   4   3
```

```
2.296E-07  4  2  1  2  2  3  2  1  4  1  4  3  2  1  1  2  1  2  1  1  1  1  3  2  4  3  4  4  2  4  4  3
2.323E-07  2  3  2  1  3  2  3  3  1  2  5  2  1  2  2  2  2  2  1  2  2  2  2  1  4  3  3  3  3  2  4  2
2.501E-07  4  2  1  1  2  4  1  1  4  1  8  3  2  2  2  1  3  2  1  1  1  2  2  2  4  2  4  3  1  3  2  3
2.706E-07  3  3  4  1  3  2  1  4  3  2  7  2  1  1  1  1  2  1  1  2  2  1  3  4  3  4  3  3  1  3  4  3
2.740E-07  2  3  3  1  3  2  3  2  3  1  7  2  1  1  2  3  2  1  1  1  1  2  2  3  3  2  4  3  2  2  4  4
2.761E-07  1  3  3  2  3  2  3  3  4  1  7  3  2  2  2  2  2  2  1  1  2  2  3  2  3  2  4  2  2  2  2  2
2.791E-07  1  2  2  2  4  4  1  2  2  1  2  2  2  1  2  2  1  1  2  2  2  1  1  2  5  5  4  1  3  2  3  2
3.114E-07  3  2  2  1  1  1  3  2  2  1  5  2  2  2  1  3  4  2  1  2  1  2  2  2  3  3  5  2  2  2  4  4
3.693E-07  3  4  4  1  3  2  2  4  2  2  8  2  2  2  2  2  4  2  2  2  2  1  1  3  3  2  3  3  4  2  3  3
3.754E-07  3  3  2  1  4  1  2  2  2  1  9  2  2  1  2  2  4  1  1  2  1  2  2  2  2  2  3  3  1  3  4  2
3.790E-07  3  2  2  1  3  3  3  4  2  1  6  2  2  1  2  3  1  2  1  1  1  2  3  3  3  1  5  3  3  1  3  4
3.984E-07  2  2  3  1  3  3  2  1  3  1  5  2  2  2  2  2  3  1  1  2  2  2  1  3  1  2  5  3  1  2  3  1
4.146E-07  4  2  2  2  3  2  4  2  3  1  3  2  2  2  1  2  1  2  1  2  2  2  2  3  4  2  2  4  2  4  3  4
4.394E-07  3  2  3  1  3  2  2  3  1  1  5  2  2  2  2  3  1  2  1  1  2  1  1  2  2  3  5  1  2  1  1  4
4.551E-07  2  4  2  1  3  3  2  3  3  1  6  3  2  1  1  2  4  1  2  2  1  2  2  1  5  2  3  2  3  2  3  3
4.955E-07  2  2  2  2  3  1  1  3  1  1  2  2  2  1  1  3  3  1  1  2  2  2  1  2  3  2  2  3  2  4  4  2
5.010E-07  4  3  3  2  3  3  2  4  3  2  3  3  2  1  2  3  2  2  1  1  1  1  3  2  4  4  2  3  2  3  3  3
5.079E-07  4  3  3  1  2  3  2  3  2  1  3  2  2  1  1  2  4  1  1  1  2  2  3  4  2  1  4  2  3  2  2  2
5.423E-07  2  3  3  1  3  2  4  3  2  1  2  3  2  1  2  1  3  2  2  2  2  2  3  3  2  4  5  3  3  3  4  3
5.452E-07  2  2  2  1  2  3  1  3  3  1  3  2  2  2  1  3  2  2  2  2  1  2  1  3  3  2  2  2  3  4  3  3
5.469E-07  3  2  3  2  3  2  3  4  2  1  8  2  2  2  1  2  3  1  2  1  1  2  1  3  4  2  5  3  3  2  3  3
5.482E-07  1  2  2  2  4  3  2  3  3  1  8  2  2  1  1  2  3  3  2  2  1  2  3  3  4  1  4  2  2  2  4  2
5.562E-07  2  1  4  1  4  2  3  2  2  1  4  3  2  2  2  2  3  1  2  1  1  2  2  4  3  2  4  4  2  3  4  3
5.774E-07  4  2  4  2  1  3  3  2  3  1  6  3  2  1  2  3  1  2  2  2  1  2  1  3  1  4  4  4  3  4  3  2
5.894E-07  3  3  2  2  2  2  2  3  2  1  3  3  2  2  2  2  3  1  1  1  1  1  2  4  3  2  2  3  2  4  2  3
6.280E-07  2  3  1  1  3  2  3  3  3  1  7  3  2  2  1  3  2  1  2  2  2  1  2  2  2  2  4  3  2  3  3  2
6.497E-07  1  1  2  1  2  2  4  2  2  2  6  2  2  2  1  2  4  1  1  1  2  2  2  3  4  3  4  4  4  4  3  3
6.596E-07  2  3  2  1  2  3  2  1  3  1  5  2  1  1  1  3  5  2  1  2  1  2  1  2  2  5  2  3  3  2  2  3
6.622E-07  1  2  2  2  2  2  3  2  2  1  4  3  2  2  1  3  2  2  1  2  1  2  2  1  3  1  2  3  4  3  4  2
7.043E-07  4  2  3  1  4  2  3  4  3  2  6  2  1  1  2  2  3  2  1  1  2  2  2  1  2  2  4  2  4  2  1  3
7.117E-07  3  3  2  2  2  2  3  2  2  1  8  2  2  1  2  2  2  2  2  2  2  2  3  2  2  2  5  3  3  3  4  3
7.913E-07  2  3  2  2  3  3  3  2  2  1  7  3  2  1  1  4  3  2  1  2  1  2  2  2  3  3  3  3  2  2  2  4
8.015E-07  2  2  2  2  2  3  3  2  2  1  9  2  2  2  1  2  3  2  1  2  2  2  2  3  1  3  5  3  3  3  4  4
8.221E-07  3  2  2  1  2  3  3  2  3  1  9  2  2  1  1  2  1  2  1  2  2  1  1  4  4  2  3  3  3  2  3  2
8.242E-07  2  3  3  2  3  3  2  3  2  1  1  2  2  1  1  3  2  2  2  2  2  2  3  2  4  4  4  2  2  3  1  3
8.374E-07  3  3  2  1  3  2  2  2  2  1  7  3  2  1  1  3  1  3  1  2  1  2  3  1  3  4  4  4  2  3  3  1
8.582E-07  3  3  2  2  3  4  4  3  3  1  5  3  2  1  1  1  5  2  1  2  1  2  1  3  2  2  3  2  2  4  4  2
1.017E-06  3  2  3  1  4  1  3  3  2  1  6  2  2  1  1  2  4  2  1  1  2  2  3  3  5  4  2  3  2  3  3  3
1.068E-06  3  2  2  2  2  3  2  3  4  1  2  2  2  1  1  3  5  2  2  1  1  1  2  3  3  3  5  4  3  3  4  2
1.071E-06  2  3  4  2  3  3  3  2  3  2  3  2  2  2  2  2  1  1  1  2  2  2  2  3  5  1  4  3  1  3  3  2
1.078E-06  2  3  4  2  3  2  2  2  3  1  5  2  1  2  2  2  2  1  1  1  1  2  3  1  2  2  3  3  2  2  2  3
1.137E-06  3  2  3  1  2  3  1  2  2  2  2  2  2  2  1  2  2  2  1  2  1  1  3  2  2  1  3  2  3  3  2  2
1.215E-06  1  4  3  2  1  3  2  3  3  1  9  2  2  1  1  2  2  1  1  2  2  2  2  1  4  3  4  2  2  3  4  3
1.320E-06  3  2  3  1  3  2  2  2  2  1  3  2  2  2  2  3  3  2  2  2  1  2  2  3  4  2  1  4  3  3  3  3
1.323E-06  2  3  4  1  4  4  3  3  3  1  3  3  2  2  2  3  1  1  1  1  2  2  1  2  4  4  3  2  3  2  4  3
1.536E-06  2  1  3  1  3  1  3  3  3  1  3  2  2  2  1  2  4  1  2  2  1  1  1  1  3  2  5  4  2  1  2  3
1.650E-06  4  2  2  1  3  2  3  2  3  1  3  2  2  1  1  3  2  1  2  2  2  1  2  3  4  1  4  2  3  1  4  3
1.908E-06  3  1  4  1  3  3  2  4  3  1  8  3  2  1  1  3  5  1  1  2  2  1  2  1  2  3  3  4  3  2  1  1
1.961E-06  2  2  3  2  3  1  2  2  3  1  8  2  2  1  1  2  4  1  1  1  2  1  2  1  2  2  4  4  3  1  3  3
1.972E-06  2  2  1  1  3  2  2  4  1  1  6  2  2  2  2  3  3  1  1  1  2  2  2  3  2  2  2  3  4  3  3  3
1.990E-06  1  2  3  1  3  2  3  2  2  1  6  2  2  1  1  2  1  2  1  1  2  2  4  3  2  1  4  4  3  4  1  2
2.197E-06  4  2  1  2  3  4  4  2  2  1  6  2  2  2  2  2  4  1  1  2  2  1  3  3  2  2  3  2  3  2  3  3
2.284E-06  3  2  3  2  3  2  2  3  3  1  3  2  2  1  2  2  1  3  1  1  2  2  1  3  3  3  4  4  4  3  4  2
2.386E-06  2  4  3  2  2  3  2  3  2  1  3  3  2  1  2  2  5  1  2  2  2  2  2  2  2  2  3  3  2  3  3  2
2.519E-06  3  4  2  2  3  2  2  3  2  1  3  3  2  2  1  2  5  3  2  1  2  2  3  2  2  2  4  3  2  3  3  4
2.636E-06  2  4  3  1  3  4  2  3  2  1  6  2  2  2  1  3  3  1  2  2  2  2  3  3  2  2  2  3  2  4  3  3
5.288E-06  2  3  2  1  2  3  3  3  2  1  8  1  2  1  2  2  4  3  1  1  1  2  1  3  3  2  4  3  4  3  4  3
5.336E-06  2  3  2  1  2  2  4  2  4  1  5  3  2  1  2  2  5  2  1  1  1  2  1  2  2  2  3  2  3  3  3  2
5.338E-06  3  3  3  2  2  2  2  2  1  1  9  3  2  2  2  3  3  1  1  2  2  1  3  2  2  3  4  3  3  3  4  3
5.468E-06  1  3  1  1  2  3  2  2  3  1  5  1  2  2  2  2  2  1  1  1  1  1  1  2  2  2  4  4  3  1  3  2
5.878E-06  4  4  3  2  1  2  4  3  2  1  5  1  2  1  1  2  1  2  1  2  1  2  1  2  3  2  2  4  4  2  3  2
6.189E-06  2  2  2  1  4  2  3  2  1  1  9  2  2  1  2  3  1  1  1  1  1  1  2  4  4  2  3  2  3  3  4  2
6.599E-06  4  4  3  2  2  3  2  2  2  1  6  3  2  1  1  2  3  2  1  2  1  2  3  2  4  2  2  3  3  3  3  3
8.140E-06  3  3  3  2  3  1  3  1  2  1  3  3  2  2  1  3  3  2  1  2  2  1  3  1  4  3  5  2  3  3  3  2
8.230E-06  2  3  2  1  3  2  3  2  3  1  7  2  2  2  1  2  1  3  1  2  1  2  3  3  2  4  4  2  3  4  2  2
8.260E-06  3  3  3  1  3  3  2  2  2  1  6  2  2  2  1  1  5  1  1  2  1  2  2  1  2  4  4  3  3  3  2  4
8.442E-06  3  4  4  1  2  3  3  2  2  1  3  2  2  2  2  3  1  2  1  2  2  2  2  2  2  4  4  3  1  2  3  3
8.587E-06  3  4  3  1  2  2  2  2  3  1  6  3  2  2  2  3  5  1  1  2  1  2  2  2  4  2  5  3  2  2  3  4
8.937E-06  2  4  3  1  3  4  1  2  3  1  6  2  2  2  1  3  2  3  1  2  1  2  1  2  2  2  5  3  3  2  3  4
1.138E-05  3  4  3  1  4  3  3  1  3  2  6  2  2  1  1  2  4  1  2  2  1  1  2  2  2  3  4  3  2  4  4  4
6.452E-05  2  4  2  1  2  3  4  4  3  1  5  3  2  1  1  3  1  2  1  1  1  1  1  2  3  4  4  2  4  3  3  3
```

```
MEAN =    1.498E-06    VARIANCE =    3.145E-11

PERCENTILES :
     5-TH =    8.482E-09  50-TH =    2.083E-07  95-TH =    8.140E-06
LOGARITHMIC MIDPOINT (OF POINTS > 0.) =    1.984E-07
NUMBER ABOVE MIDPOINT = 76
NUMBER BELOW MIDPOINT =  74
CHI-SQUARED(1) =    2.667E-02
DO NOT REJECT NULL (p > .05)
```

```
CONSEQUENCE MEASURE:
 EARLY FATALITIES


 BASE CASE :
  PEACH BOTTOM LLH (MACCS)

 FRACTIONAL CONTRIBUTION OF EACH SEQUENCE TO MEAN RISK
                 SEQUENCE            CONTRIBUTION
                 TB                          0.1884
                 TBUX                        0.7593
                 TBU                         0.0126
                 TCSX                        0.0081
                 TCUX                        0.0008
                 TCSRX2                      0.0202
                 TCSRV23                     0.0107
```

```
CONSEQUENCE MEASURE:
 EARLY FATALITIES


 BASE CASE :
  PEACH BOTTOM LLH (MACCS)

 FRACTIONAL CONTRIBUTION OF EACH NONZERO BIN TO MEAN RISK
                    BIN                              CONTRIBUTION
            AAACACGGDABCBABBECABBB                      0.0001
            AAACACGGDABCBABBEDABBB                      0.0002
            AAACACGGDABCBABBEEABBB                      0.0002
            AAACACGGDABCBADBEDABBB                      0.0001
            AAACACGGDABCBADBEEABBB                      0.0002
            BAACAAGBDAACBBBBHHABBB                      0.0001
            BAACAAGBDAACBDDBHHABBB                      0.0001
            BAACAAGBDABCBBBBHHABBB                      0.0001
            BAACACGBDAACBBBBHHABBB                      0.0033
            BAACACGBDAACBDDBHHABBB                      0.0015
            BAACACGBDABCBBBBHHABBB                      0.0001
            BAACACGBDABCBDDBHHABBB                      0.0001
            BAACACGBFAACCBBBHHABBB                      0.0009
            BAACACGBFAACCDDBHHABBB                      0.0001
            BAACACGBFABCCBBBHHABBB                      0.0002
            BAACACGGDAACBABBDDABBB                      0.0003
            BAACCCGBDAACBDDBHHABBB                      0.0001
            BAACCCGBFAACCBBBHHABBB                      0.0002
            BAACCCGGDAACBADBDDABBB                      0.0001
            BABBACGCFAACCBBBHHABBB                      0.0002
            BABBACGCFAACCBBBHHBBBB                      0.0001
            BACBAAGCFABCCBBBHHABBB                      0.0001
            CAACAABGFDACBCCBACABAB                      0.0002
            CAACAABGFDACBCCBADABAB                      0.0002
            CAACAABGFDACBCCBAEABAB                      0.0001
            CAACACBGDDACBABBADABAB                      0.0001
            CAACACBGDDACBABBAEABAB                      0.0001
            CAACACBGDDACBCCBAABAAB                      0.0001
            CAACACBGDDACBCDBADABAB                      0.0001
            CAACACBGDDACBCDBAEABAB                      0.0003
            CAACACBGDDACBCDBAFABAB                      0.0001
            CAACACBGFDACBCCBACABAB                      0.0003
            CAACACBGFDACBCCBADABAB                      0.0003
            CAACACBGFDACBCDBACABAB                      0.0002
            CAACACBGFDACBCDBADABAB                      0.0004
            CAACACBGFDACBCDBAEABAB                      0.0002
            CAACCCBGDDACBABBADABAB                      0.0001
            CAACCCBGDDACBABBAEABAB                      0.0001
            CAACCCBGDDACBCDBADABAB                      0.0003
            CAACCCBGDDACBCDBAEABAB                      0.0003
            CAACCCBGFDACBCCBACABAB                      0.0001
            CAACCCBGFDACBCCBADABAB                      0.0001
            CAACCCBGFDACBCCBAEABAB                      0.0001
            CAACCCBGFDACBCDBAEABAB                      0.0001
            DAAAAAGBDABCBBBBHHABBB                      0.0002
            DAAAAAGBDDACBBBBHHABBB                      0.0007
            DAAAAAGBDDACBDDBHHABBB                      0.0001
            DAAAAAGBFABCCBBBHHABBB                      0.0002
            DAAAAAGBFDACCBBBHHABBB                      0.0009
            DAAAAAGBFDACCDDBHHABBB                      0.0005
            DAAAAAGGDDACBDDBADABAB                      0.0001
            DAAAACGBDABCBBBBHHABBB                      0.0003
```

DAAAACGBDABCBDDBHHABBB	0.0001
DAAAACGBDDACBBBBHHABBB	0.0029
DAAAACGBDDACBBBBHHBABB	0.0001
DAAAACGBDDACBDDBHHABBB	0.0019
DAAAACGBFABCCBBBHHABBB	0.0002
DAAAACGBFDACCBBBHHABBB	0.0021
DAAAACGBFDACCDDBHHABBB	0.0009
DAAAACGBFDACCDDBHHBABB	0.0001
DAAAACGGDDACBBBBADABAB	0.0002
DAAAACGGDDACBBBBAEABAB	0.0008
DAAAACGGDDACBDDBACABAB	0.0001
DAAAACGGDDACBDDBADABAB	0.0001
DAAAACGGDDACBDDBAEABAB	0.0009
DAAAACGGDDACBDDBAGABAB	0.0003
DAAACCGBDDACBBBBHHABBB	0.0003
DAAACCGBDDACBDDBHHABBB	0.0004
DAAACCGBFDACCBBBHHABBB	0.0001
DAAACCGBFDACCDDBHHABBB	0.0002
DAAACCGGDDACBBBBADABAB	0.0001
DAAACCGGDDACBBBBAEABAB	0.0001
DAAACCGGDDACBDDBACABAB	0.0001
DAAACCGGDDACBDDBADABAB	0.0001
DAAACCGGDDACBDDBAEABAB	0.0001
DABAAAGADABCBBBBHGABAB	0.0001
DABAAAGADABCBDDBHGABAB	0.0008
DABAAAGADDACBBBBHGABAB	0.0007
DABAAAGADDACBDDBHGABAB	0.0006
DABAACGADABCBBBBHGABAB	0.0013
DABAACGADABCBDDBHGABAB	0.0004
DABAACGADDACBBBBHGABAB	0.0048
DABAACGADDACBDDBHGABAB	0.0014
DACAAAGADABCCBBBHHABBB	0.0002
DACAAAGADABCCDDBHHABBB	0.0003
EBAACCFGFDBCBADBEHBBBB	0.0001
EBAACCGGDDBCBABBEGABBB	0.0011
EBAACCGGDDBCBABBEGBBBB	0.0007
EBAACCGGDDBCBABBEHABBB	0.0018
EBAACCGGDDBCBABBEHBBBB	0.0031
EBAACCGGDDBCBADBEHABBB	0.0025
EBAACCGGDDBCBADBEHBBBB	0.0033
EBACBBGEFCBCCABBFEABBA	0.0002
EBACBBGGDCBCBABBFBBABA	0.0049
EBACBBGGDCBCBABBFCBABA	0.0003
EBACBBGGDCBCBABBFDABBA	0.0004
EBACBBGGDCBCBABBFEABBA	0.0001
EBACBBGGDCBCBABBFFABBA	0.0001
EBACBCGGDCBCBABBFBBABA	0.0060
EBACBCGGDCBCBABBFCBABA	0.0003
EBACBCGGDCBCBABBFDABBA	0.0001
EBACBCGGDCBCBABBFEABBA	0.0003
EBACBCGGDCBCBABBFFABBA	0.0001
EBACBCGGDCBCBABBFFBBBA	0.0009
EBACBCGGDCBCBADBFBBABA	0.0008
EBACBCGGDCBCBADBFEABBA	0.0006
EBACBCGGDCBCBADBFFABBA	0.0001
EBACCCDEEDBCCADBFBBABB	0.0001
EBACCCDGFDBCBADBFBBABB	0.0031
EBACCCDGFDBCBADBFEBBBB	0.0001
EBACCCFGFDBBBADBFCBABB	0.0015
EBACCCFGFDBBBADBFEABBB	0.0001
EBACCCFGFDBCBABBFCBABB	0.0005
EBACCCFGFDBCBABBFEABBB	0.0021
EBACCCFGFDBCBACBFCBABB	0.0016
EBACCCFGFDBCBACBFEABBB	0.0002
EBACCCFGFDBCBADBFBBABB	0.0007
EBACCCFGFDBCBADBFCBABB	0.0230
EBACCCFGFDBCBADBFEABBB	0.0015
EBACCCFGFDBCBADBFEBBBB	0.0003
EBACCCFGFDBCBADBFFABBB	0.0001
EBACCCGEFDBCCABBFEABBB	0.0001
EBACCCGEFDBCCADBFCBABB	0.0116
EBACCCGEFDBCCADBFEBBBB	0.0016
EBACCCGGDDBBBABBFABABB	0.0002
EBACCCGGDDBBBABBFEABBB	0.0003
EBACCCGGDDBBBABBFFABBB	0.0002
EBACCCGGDDBBBABBFGABBB	0.0002
EBACCCGGDDBBBADBFABABB	0.0005
EBACCCGGDDBBBADBFCBABB	0.0002
EBACCCGGDDBCBABBFABABB	0.0341
EBACCCGGDDBCBABBFBABAB	0.0001
EBACCCGGDDBCBABBFBBABB	0.0998
EBACCCGGDDBCBABBFCBABB	0.0259
EBACCCGGDDBCBABBFCBBBB	0.0005
EBACCCGGDDBCBABBFDABBB	0.0415
EBACCCGGDDBCBABBFDBBBB	0.0005
EBACCCGGDDBCBABBFEABBB	0.0413

EBACCCGGDDBCBABBFEBBBB	0.0125
EBACCCGGDDBCBABBFFABBB	0.0426
EBACCCGGDDBCBABBFFBBBB	0.0023
EBACCCGGDDBCBABBFGABBB	0.0067
EBACCCGGDDBCBADBFABABB	0.0554
EBACCCGGDDBCBADBFBBABB	0.2333
EBACCCGGDDBCBADBFCBABB	0.0019
EBACCCGGDDBCBADBFEABBB	0.0236
EBACCCGGDDBCBADBFEBBBB	0.0027
EBACCCGGDDBCBADBFFABBB	0.0205
EBACCCGGDDBCBADBFFBBBB	0.0281
EBACCCGGDDBCBADBFGABBB	0.0005
EBACCCGGEDBBBADBFEABBB	0.0002
EBACCCGGEDBCBABBFBBABB	0.0001
EBACCCGGEDBCBABBFCBABB	0.0025
EBACCCGGEDBCBABBFCBBBB	0.0004
EBACCCGGEDBCBABBFEABBB	0.0103
EBACCCGGEDBCBABBFEBBBB	0.0013
EBACCCGGEDBCBADBFCBABB	0.0038
EBACCCGGEDBCBADBFDBBBB	0.0001
EBACCCGGEDBCBADBFEABBB	0.0004
EBACCCGGEDBCBADBFEBBBB	0.0011
EBBBACGGDDBCBADBDGABBB	0.0001
EBBBACGGDDBCBADBEGABBB	0.0001
EBCBAAGCFBBACDDBHHABBB	0.0001
FCACBBGGDCBCBABBDEABBA	0.0001
FCACBBGGDCBCBABBEBBABA	0.0002
FCACBCGGDCBCBABBDBBABA	0.0001
FCACBCGGDCBCBABBDEABBA	0.0001
FCACBCGGDCBCBABBEBBABA	0.0001
FCACBCGGDCBCBADBEEABBA	0.0001
FCACCCDGFDBCBACBDCBABB	0.0001
FCACCCDGFDBCBACBEBBABB	0.0002
FCACCCDGFDBCBADBDBBABB	0.0009
FCACCCDGFDBCBADBDCBABB	0.0006
FCACCCDGFDBCBADBDEABBB	0.0001
FCACCCDGFDBCBADBEBBABB	0.0025
FCACCCFGFDBCBABBEEABBB	0.0001
FCACCCFGFDBCBABBGEABBB	0.0010
FCACCCFGFDBCBADBDEABBB	0.0001
FCACCCFGFDBCBADBDFABBB	0.0001
FCACCCFGFDBCBADBDFBBBB	0.0001
FCACCCFGFDBCBADBEEABBB	0.0004
FCACCCFGFDBCBADBGBBABB	0.0001
FCACCCGBDDBCBABBHHABBB	0.0001
FCACCCGBDDBCBABBHHBABB	0.0002
FCACCCGBDDBCBDDBHHABBB	0.0032
FCACCCGBDDBCBDDBHHBABB	0.0023
FCACCCGBFDBCCDDBHHBABB	0.0001
FCACCCGDFDBCBADBDCFABB	0.0001
FCACCCGEFDBCCADBEGABBB	0.0001
FCACCCGGDDBBBABBEABABB	0.0001
FCACCCGGDDBBBABBECBABB	0.0006
FCACCCGGDDBBBABBEEABBB	0.0010
FCACCCGGDDBBBABBEEBBBB	0.0001
FCACCCGGDDBBBADBEBBABB	0.0001
FCACCCGGDDBBBADBGCBABB	0.0001
FCACCCGGDDBCBABBCABABB	0.0001
FCACCCGGDDBCBABBCBBABB	0.0008
FCACCCGGDDBCBABBDABABB	0.0011
FCACCCGGDDBCBABBDBBABB	0.0056
FCACCCGGDDBCBABBDCBABB	0.0018
FCACCCGGDDBCBABBDDABBB	0.0004
FCACCCGGDDBCBABBDEABBB	0.0136
FCACCCGGDDBCBABBDEBBBB	0.0010
FCACCCGGDDBCBABBDFABBB	0.0007
FCACCCGGDDBCBABBDFBBBB	0.0001
FCACCCGGDDBCBABBDGABBB	0.0025
FCACCCGGDDBCBABBEABABB	0.0042
FCACCCGGDDBCBABBEBBABB	0.0184
FCACCCGGDDBCBABBECBABB	0.0016
FCACCCGGDDBCBABBEDABBB	0.0046
FCACCCGGDDBCBABBEEABBB	0.0126
FCACCCGGDDBCBABBEEBBBB	0.0007
FCACCCGGDDBCBABBEFABBB	0.0015
FCACCCGGDDBCBABBEFBBBB	0.0008
FCACCCGGDDBCBABBEGABBB	0.0011
FCACCCGGDDBCBABBGABABB	0.0001
FCACCCGGDDBCBABBGBBABB	0.0008
FCACCCGGDDBCBABBGCBABB	0.0078
FCACCCGGDDBCBABBGEABBB	0.0003
FCACCCGGDDBCBACBEABABB	0.0002
FCACCCGGDDBCBADBDABABB	0.0027
FCACCCGGDDBCBADBDBBABB	0.0077
FCACCCGGDDBCBADBDCBABB	0.0107
FCACCCGGDDBCBADBDEABBB	0.0025

146

FCACCCGGDDBCBADBDEBBBB	0.0007
FCACCCGGDDBCBADBDFABBB	0.0007
FCACCCGGDDBCBADBDGABBB	0.0227
FCACCCGGDDBCBADBEABABB	0.0049
FCACCCGGDDBCBADBEBBABB	0.0032
FCACCCGGDDBCBADBECBABB	0.0129
FCACCCGGDDBCBADBEEABBB	0.0078
FCACCCGGDDBCBADBEEBBBB	0.0010
FCACCCGGDDBCBADBEFABBB	0.0023
FCACCCGGDDBCBADBEFBBBB	0.0002
FCACCCGGDDBCBADBGCBABB	0.0001
FCACCCGGDDBCBADBGEABBB	0.0003
FCACCCGGDDBCBDDBHABABB	0.0001
FCACCCGGEDBCBABBDEABBB	0.0002
FCACCCGGEDBCBABBECBABB	0.0001
FCACCCGGEDBCBABBEEABBB	0.0027
FCACCCGGEDBCBABBGEABBB	0.0001
FCACCCGGEDBCBADBCFABBB	0.0002
FCBBAAGCDBBBBBBBHHABBB	0.0002
FCBBAAGCDBBCBBBBHHABBB	0.0003
FCBBAAGCFBBBCDDBHHABBB	0.0001
FCBBAAGCFBBCCDDBHHABBB	0.0001
FCBBACGCDBBBBBBBHHABBB	0.0003
FCBBACGCDBBCBBBBHHABBB	0.0005
FCBBACGCDBBCBBBBHHBBBB	0.0001
FCBBACGCFBBBCDDBHHABBB	0.0001
FCBBACGCFBBCCBBBHHABBB	0.0001
FCBBACGCFBBCCDDBHHABBB	0.0004
FCBBACGGDBBCBABBEGABBB	0.0001
FCBBACGGDBBCBADBEGABBB	0.0002
FCCBAAGCFBBBCBBBHHABBB	0.0005
FCCBAAGCFBBBCDDBHHABBB	0.0002
FCCBAAGCFBBCCBBBHHABBB	0.0013
FCCBAAGCFBBCCDDBHHABBB	0.0013

CONSEQUENCE MEASURE:
EARLY FATALITIES

BASE CASE :
PEACH BOTTOM LLH (MACCS)

FRACTIONAL CONTRIBUTIONS OF EACH RELEASE TO MEAN RISK

RELEASE	CONTRIBUTION
PCH 1D	0.0000
PCH 2D	0.0000
PCH 3D	0.0002
PCH 4D	0.0013
PCH 5D	0.0094
PCH 6D	0.1780
PCH 7D	0.0356
PCH 8D	0.1325
PCH 9D	0.6033
PCH 10D	0.0000
PCH 11D	0.0000
PCH 12D	0.0000
PCH 13D	0.0000
PCH 14D	0.0000
PCH 15D	0.0000
PCH 16D	0.0010
PCH 17D	0.0000
PCH 18D	0.0000
PCH 19D	0.0001
PCH 20D	0.0000
PCH 21D	0.0002
PCH 22D	0.0001
PCH 23D	0.0006
PCH 24D	0.0024
PCH 25D	0.0000
PCH 26D	0.0002
PCH 27D	0.0029
PCH 28D	0.0014
PCH 29D	0.0014
PCH 30D	0.0020
PCH 31D	0.0012
PCH 32D	0.0013
PCH 33D	0.0001
PCH 34D	0.0006
PCH 35D	0.0000
PCH 36D	0.0033
PCH 37D	0.0023
PCH 38D	0.0014
PCH 39D	0.0007
PCH 40D	0.0002
PCH 41D	0.0007
PCH 42D	0.0040
PCH 43D	0.0004
PCH 44D	0.0008
PCH 45D	0.0016
PCH 46D	0.0020
PCH 47D	0.0007
PCH 48D	0.0035
PCH 49D	0.0000
PCH 50D	0.0019
PCH 51D	0.0006
PCH 52D	0.0003
PCH 53D	0.0001
PCH 54D	0.0000

```
CONSEQUENCE MEASURE:
  EARLY FATALITIES

  SENSITIVITY OF RISK TO ISSUES
  DISTRIBUTION OF RISK AT EACH LEVEL OF EACH ISSUE
  BASE CASE :
   PEACH BOTTOM LLH (MACCS)

 GP ISS LVL NUM      5%          50%         MEAN         95%        R**2    F   DF       SIGNIF.
  1   1   1  15  0.1814E-07  0.2761E-06  0.7769E-06  0.4247E-05    0.01     0.7(  3,146)    0.56NS
          3  60  0.7501E-08  0.1996E-06  0.1188E-05  0.8350E-05
          4  15  0.4803E-07  0.5010E-06  0.1318E-05  0.6411E-05
          2  60  0.7766E-08  0.1523E-06  0.2032E-05  0.7137E-05
  1   2   1  15  0.6205E-08  0.7804E-07  0.3676E-06  0.1807E-05    0.14     7.7(  3,146)    0.00**
          2  60  0.5076E-08  0.1900E-06  0.5593E-06  0.2091E-05
          3  60  0.9124E-08  0.1943E-06  0.1024E-05  0.6672E-05
          4  15  0.8594E-07  0.2636E-05  0.8275E-05  0.4181E-04
  1   3   1  15  0.8117E-08  0.1583E-06  0.7604E-06  0.4353E-05    0.02     1.0(  3,146)    0.41NS
          4  15  0.6078E-07  0.3693E-06  0.1099E-05  0.5820E-05
          3  60  0.8214E-08  0.1900E-06  0.1466E-05  0.8422E-05
          2  60  0.7173E-08  0.2008E-06  0.1813E-05  0.5747E-05
  1   4   2  62  0.7988E-06  0.2083E-06  0.8669E-06  0.5548E-05    0.00     0.0(  1,148)    1.00NS
          1  88  0.8428E-08  0.2063E-06  0.1942E-05  0.8456E-05
  1   5   1  15  0.2244E-08  0.2096E-07  0.5502E-06  0.3963E-05    0.08     4.1(  3,146)    0.01**
          3  60  0.7859E-08  0.3886E-06  0.1154E-05  0.8185E-05
          4  15  0.8547E-08  0.3754E-06  0.1517E-05  0.9771E-05
          2  60  0.1844E-07  0.1579E-06  0.2073E-05  0.7464E-05
  2   1   1  15  0.1126E-07  0.2275E-06  0.9783E-06  0.5703E-05    0.00     0.1(  3,146)    0.96NS
          2  60  0.7826E-08  0.2173E-06  0.1053E-05  0.6032E-05
          4  15  0.8533E-08  0.1084E-06  0.1126E-05  0.6586E-05
          3  60  0.8583E-08  0.2045E-06  0.2165E-05  0.8350E-05
  2   2   1  15  0.6205E-08  0.1904E-06  0.8397E-06  0.5338E-05    0.01     0(  3,146)   0.72NS
          2  60  0.1288E-07  0.2209E-06  0.1070E-05  0.6007E-05
          3  60  0.7849E-08  0.1935E-06  0.1116E-05  0.8185E-05
          4  15  0.1517E-08  0.4146E-06  0.5391E-05  0.3545E-04
  2   3   3  60  0.6482E-08  0.1599E-06  0.6164E-06  0.2576E-05    0.03     1.6(  3,146)    0.20NS
          1  15  0.1032E-07  0.1330E-06  0.1447E-05  0.1046E-04
          2  60  0.1462E-07  0.2948E-06  0.1573E-05  0.8350E-05
          4  15  0.8117E-08  0.3693E-06  0.4771E-05  0.2698E-04
  2   4   4  15  0.3355E-08  0.8762E-07  0.5247E-06  0.3569E-05    0.02     1.0(  3,146)    0.39NS
          1  15  0.1185E-08  0.1545E-06  0.1038E-05  0.5965E-05
          2  60  0.1280E-07  0.2948E-06  0.1167E-05  0.7329E-05
          3  60  0.7092E-08  0.2280E-06  0.2186E-05  0.8760E-05
  2   5   2  24  0.1515E-07  0.1851E-06  0.7424E-06  0.2269E-05    0.01     0.9(  1,148)    0.34NS
          1 126  0.8374E-08  0.2203E-06  0.1641E-05  0.8158E-05
  2   6   4   9  0.7955E-08  0.1583E-06  0.2368E-06  0.6622E-06    0.05     0.9(  8,141)    0.52NS
          2  11  0.4927E-07  0.2285E-06  0.3764E-06  0.1134E-05
          1   2************************  0.4372E-06************
          7  20  0.8768E-08  0.1490E-06  0.6205E-06  0.2625E-05
          8  16  0.1352E-08  0.2227E-06  0.7606E-06  0.3927E-05
          9  12  0.8893E-08  0.2599E-06  0.1266E-05  0.6098E-05
          6  38  0.8907E-08  0.1279E-06  0.1527E-05  0.8795E-05
          3  20  0.1116E-07  0.7945E-06  0.1669E-05  0.8290E-05
          5  22  0.5060E-08  0.2233E-06  0.3923E-05  0.1533E-04
  2   7   2  94  0.1089E-07  0.2140E-06  0.9751E-06  0.7774E-05    0.01     0.9(  2,147)    0.41NS
          3  51  0.3141E-08  0.1842E-06  0.2278E-05  0.8055E-05
          1   5  0.4084E-07  0.5288E-05  0.3360E-05  0.5878E-05
  2   8   1  15  0.1078E-08  0.2033E-06  0.2750E-06  0.9692E-06    0.01     0.8(  1,148)    0.38NS
          2 135  0.8669E-08  0.2145E-06  0.1633E-05  0.8207E-05
  2   9   2  75  0.6205E-08  0.2033E-06  0.1191E-05  0.8252E-05    0.00     0.1(  1,148)    0.76NS
          1  75  0.8902E-08  0.2145E-06  0.1805E-05  0.6110E-05
  2  10   2  75  0.6205E-08  0.1545E-06  0.9162E-06  0.5435E-05    0.03     4.4(  1,148)    0.04 *
          1  75  0.1090E-07  0.2706E-06  0.2079E-05  0.8252E-05
  2  11   4   4************************  0.2615E-06************    0.06     3.4(  3,146)    0.02 *
          1  16  0.1958E-08  0.4528E-07  0.6547E-06  0.4188E-05
          2  80  0.1026E-07  0.2058E-06  0.1023E-05  0.5670E-05
          3  50  0.8482E-08  0.3435E-06  0.2626E-05  0.8587E-05
  2  12   2  45  0.5023E-08  0.1493E-06  0.5930E-06  0.2227E-05    0.05     2.0(  4,145)    0.09NS
          3  38  0.7703E-08  0.1820E-06  0.8949E-06  0.6062E-05
          4  22  0.3458E-08  0.3391E-06  0.1227E-05  0.7185E-05
          5  15  0.1013E-07  0.8582E-06  0.2144E-05  0.8504E-05
          1  30  0.1207E-07  0.3252E-06  0.3493E-05  0.8442E-05
  2  13   1  60  0.1306E-07  0.2723E-06  0.1245E-05  0.7150E-05    0.02     1.2(  2,147)    0.30NS
          2  75  0.8083E-08  0.1583E-06  0.1608E-05  0.6411E-05
          3  15  0.4692E-08  0.2135E-06  0.1958E-05  0.8754E-05
  2  14   2  75  0.6205E-08  0.9414E-07  0.4696E-06  0.2176E-05    0.18    31.6(  1,148)    0.00**
          1  75  0.2760E-07  0.5010E-06  0.2526E-05  0.8396E-05
  2  15   2  90  0.8664E-08  0.2280E-06  0.1265E-05  0.8260E-05    0.00     0.2(  1,148)    0.68NS
          1  60  0.8214E-08  0.1996E-06  0.1846E-05  0.5401E-05
  2  16   2  75  0.7313E-08  0.1800E-06  0.8050E-06  0.2606E-05    0.00     0.4(  1,148)    0.51NS
          1  75  0.9169E-08  0.2135E-06  0.2190E-05  0.8504E-05
  2  17   2 120  0.7521E-08  0.1564E-06  0.8934E-06  0.6228E-05    0.07    11.4(  1,148)    0.00**
          1  30  0.2530E-07  0.6084E-06  0.3914E-05  0.1138E-04
  3   1   4   3************************  0.7825E-06************    0.03     1.3(  3,146)    0.27NS
          2  74  0.7335E-08  0.1548E-06  0.9277E-06  0.7797E-05
          3  39  0.9155E-08  0.2706E-06  0.1185E-05  0.7407E-05
```

```
            1  34  0.8668E-08  0.4184E-06  0.3159E-05  0.8218E-05
  3    2    4  15  0.1111E-07  0.1615E-06  0.6420E-06  0.3736E-05   0.01    0.5(  3,146)   0.67NS
            3  51  0.1093E-07  0.2275E-06  0.7803E-06  0.2617E-05
            1  29  0.7581E-08  0.1230E-06  0.9732E-06  0.8146E-05
            2  55  0.6205E-08  0.2296E-06  0.2673E-05  0.8848E-05
  3    3    1  14  0.1209E-07  0.1485E-06  0.2152E-06  0.7506E-06   0.01    0.5(  4,145)   0.71NS
            5   7  0.8482E-08  0.2791E-06  0.4208E-06  0.1071E-05
            4  35  0.3757E-08  0.2296E-06  0.1171E-05  0.7724E-05
            2  58  0.7413E-08  0.2050E-06  0.1536E-05  0.8368E-05
            3  36  0.4719E-07  0.2723E-06  0.2462E-05  0.5695E-05
  3    4    5   5  0.1099E-07  0.1615E-06  0.2444E-06  0.6596E-06   0.01    0.4(  4,145)   0.80NS
            1  15  0.2411E-07  0.3790E-06  0.5786E-06  0.1899E-05
            2  76  0.7084E-08  0.1791E-06  0.1077E-05  0.6094E-05
            3  30  0.8606E-08  0.2155E-06  0.1218E-05  0.8140E-05
            4  24  0.1529E-07  0.2409E-06  0.4015E-05  0.1554E-04
  3    5    1   4*************************  0.3765E-06************   0.10    3.9(  4,145)   0.02**
            3  46  0.8188E-08  0.1650E-06  0.6204E-06  0.2803E-05
            2  35  0.9976E-08  0.1108E-06  0.6741E-06  0.4810E-05
            5  15  0.1754E-06  0.5469E-06  0.2186E-05  0.8848E-05
            4  50  0.5940E-08  0.2776E-06  0.2764E-05  0.8442E-05
  3    6    1   4*************************  0.2679E-06************   0.02    1.2(  3,146)   0.31NS
            3  76  0.7354E-08  0.1971E-06  0.1171E-05  0.8387E-05
            4  23  0.8617E-08  0.5774E-06  0.1193E-05  0.5608E-05
            2  47  0.8682E-08  0.1330E-06  0.2280E-05  0.8154E-05
  3    7    1  18  0.8162E-08  0.7973E-07  0.6349E-06  0.3696E-05   0.08    4.0(  3,146)   0.01**
            2  62  0.6596E-08  0.1821E-06  0.7133E-06  0.2565E-05
            3  55  0.1561E-07  0.4551E-06  0.1562E-05  0.8207E-05
            4  15  0.5358E-07  0.6497E-06  0.5537E-05  0.3545E-04
  3    8    1  25  0.6798E-08  0.6856E-07  0.5073E-06  0.2534E-05   0.15    8.7(  3,146)   0.00**
            2  58  0.4260E-08  0.1485E-06  0.8155E-06  0.7304E-05
            4  15  0.8086E-07  0.5774E-06  0.1927E-05  0.1049E-04
            3  52  0.3294E-07  0.5492E-06  0.2611E-05  0.7971E-05
  3    9    1  12  0.8035E-09  0.1790E-06  0.5287E-06  0.1982E-05   0.03    1.4(  3,146)   0.25NS
            4  54  0.8058E-08  0.1931E-06  0.8386E-06  0.5328E-05
            2  27  0.6753E-08  0.1501E-06  0.9129E-06  0.8234E-05
            3  57  0.2176E-07  0.3984E-06  0.2603E-05  0.8536E-05
  3   10    1   7  0.3038E-08  0.1330E-06  0.4792E-06  0.1908E-05   0.01    0.5(  3,146)   0.67NS
            2  49  0.6571E-08  0.2135E-06  0.1170E-05  0.6275E-05
            3  73  0.1089E-07  0.1686E-06  0.1644E-05  0.5331E-05
            4  21  0.2609E-07  0.3114E-06  0.2091E-05  0.9962E-05
  3   11    2  75  0.8527E-08  0.2275E-06  0.1138E-05  0.7788E-05   0.00    0.1(  1,148)   0.75NS
            1  75  0.8131E-08  0.1959E-06  0.1857E-05  0.7601E-05
  3   12    2  50  0.3038E-08  0.1873E-06  0.7020E-06  0.2386E-05   0.02    1.5(  2,147)   0.23NS
            3  50  0.8482E-08  0.1552E-06  0.1227E-05  0.8140E-05
            1  50  0.1508E-07  0.2903E-06  0.2564E-05  0.8442E-05
  3   13    1  38  0.7413E-08  0.1650E-06  0.7795E-06  0.5656E-05   0.02    1.1(  3,146)   0.36NS
            4  37  0.8250E-08  0.2761E-06  0.9957E-06  0.5858E-05
            3  38  0.1051E-07  0.2280E-06  0.1257E-05  0.7485E-05
            2  37  0.4384E-08  0.2740E-06  0.2984E-05  0.8813E-05
  3   14    4  30  0.2530E-07  0.1968E-06  0.6310E-06  0.2386E-05   0.01    0.2(  4,145)   0.92NS
            3  30  0.5940E-08  0.2088E-06  0.7479E-06  0.2636E-05
            5  30  0.8482E-08  0.1465E-06  0.1278E-05  0.8230E-05
            2  30  0.7955E-08  0.1369E-06  0.1789E-05  0.8587E-05
            1  30  0.7073E-08  0.2776E-06  0.3041E-05  0.8937E-05
  4    1    6  19  0.9066E-08  0.6910E-07  0.6097E-06  0.3690E-05   0.04    0.9(  7,142)   0.51NS
            2  18  0.6849E-08  0.3223E-06  0.8263E-06  0.3953E-05
            4  19  0.4454E-08  0.3114E-06  0.9176E-06  0.5408E-05
            5  19  0.6285E-07  0.3693E-06  0.1051E-05  0.5000E-05
            3  19  0.3140E-07  0.1800E-06  0.1147E-05  0.6704E-05
            7  18  0.2923E-08  0.2227E-06  0.1539E-05  0.8795E-05
            1  19  0.1938E-08  0.1108E-06  0.1812E-05  0.9851E-05
            8  19  0.1007E-07  0.8762E-07  0.4045E-05  0.2313E-04
NS=NOT SIGNIFICANT, *=SIGNIFICANT (P<.05), **=SIGNIFICANT (P<.01)
```

```
     CONSEQUENCE MEASURE:  EARLY FATALITIES
0    ISSUE GROUP =   1   ISSUE =   1   SLC FAILURE TO ACTUATE

     LEVEL 1 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 2 NO.<MED.= 33 NO. EXP.= 30     NO.>=MED.= 27 NO. EXP.= 30   CHI-SQ.=   0.6 DF= 1 SIG.= 0.439
     LEVEL 3 NO.<MED.= 30 NO. EXP.= 30     NO.>=MED.= 30 NO. EXP.= 30   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 4 NO.<MED.=  4 NO. EXP.=  7     NO.>=MED.= 11 NO. EXP.=  8   CHI-SQ.=   2.4 DF= 1 SIG.= 0.120
     OVERALL CHI-SQ=   3.0 DF=  7  SIG.= 0.884

0    ISSUE GROUP =   1   ISSUE =   2   DC COMMON MODE

     LEVEL 1 NO.<MED.= 10 NO. EXP.=  7     NO.>=MED.=  5 NO. EXP.=  8   CHI-SQ.=   2.4 DF= 1 SIG.= 0.120
     LEVEL 2 NO.<MED.= 31 NO. EXP.= 30     NO.>=MED.= 29 NO. EXP.= 30   CHI-SQ.=   0.1 DF= 1 SIG.= 0.796
     LEVEL 3 NO.<MED.= 31 NO. EXP.= 30     NO.>=MED.= 29 NO. EXP.= 30   CHI-SQ.=   0.1 DF= 1 SIG.= 0.796
     LEVEL 4 NO.<MED.=  2 NO. EXP.=  7     NO.>=MED.= 13 NO. EXP.=  8   CHI-SQ.=   6.7 DF= 1 SIG.= 0.010
     OVERALL CHI-SQ=   9.2 DF=  7  SIG.= 0.236

0    ISSUE GROUP =   1   ISSUE =   3   FAILURE TO VENT

     LEVEL 1 NO.<MED.=  9 NO. EXP.=  7     NO.>=MED.=  6 NO. EXP.=  8   CHI-SQ.=   1.1 DF= 1 SIG.= 0.301
     LEVEL 2 NO.<MED.= 30 NO. EXP.= 30     NO.>=MED.= 30 NO. EXP.= 30   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 3 NO.<MED.= 31 NO. EXP.= 30     NO.>=MED.= 29 NO. EXP.= 30   CHI-SQ.=   0.1 DF= 1 SIG.= 0.796
     LEVEL 4 NO.<MED.=  4 NO. EXP.=  7     NO.>=MED.= 11 NO. EXP.=  8   CHI-SQ.=   2.4 DF= 1 SIG.= 0.120
     OVERALL CHI-SQ=   3.5 DF=  7  SIG.= 0.830

0    ISSUE GROUP =   1   ISSUE =   4   SW MOD A VS. MOD B

     LEVEL 1 NO.<MED.= 44 NO. EXP.= 44     NO.>=MED.= 44 NO. EXP.= 44   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 2 NO.<MED.= 30 NO. EXP.= 31     NO.>=MED.= 32 NO. EXP.= 31   CHI-SQ.=   0.1 DF= 1 SIG.= 0.799
     OVERALL CHI-SQ=   0.1 DF=  3  SIG.= 0.996

0    ISSUE GROUP =   1   ISSUE =   5   POWER RECOVERY

     LEVEL 1 NO.<MED.= 11 NO. EXP.=  7     NO.>=MED.=  4 NO. EXP.=  8   CHI-SQ.=   4.3 DF= 1 SIG.= 0.038
     LEVEL 2 NO.<MED.= 34 NO. EXP.= 30     NO.>=MED.= 26 NO. EXP.= 30   CHI-SQ.=   1.1 DF= 1 SIG.= 0.302
     LEVEL 3 NO.<MED.= 23 NO. EXP.= 30     NO.>=MED.= 37 NO. EXP.= 30   CHI-SQ.=   3.3 DF= 1 SIG.= 0.071
     LEVEL 4 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
     OVERALL CHI-SQ=   8.9 DF=  7  SIG.= 0.261

0    ISSUE GROUP =   2   ISSUE =   1   PROB. OF STUCK OPEN VAC. BRKR.

     LEVEL 1 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 2 NO.<MED.= 29 NO. EXP.= 30     NO.>=MED.= 31 NO. EXP.= 30   CHI-SQ.=   0.1 DF= 1 SIG.= 0.796
     LEVEL 3 NO.<MED.= 30 NO. EXP.= 30     NO.>=MED.= 30 NO. EXP.= 30   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 4 NO.<MED.=  8 NO. EXP.=  7     NO.>=MED.=  7 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
     OVERALL CHI-SQ=   0.3 DF=  7  SIG.= 1.000

0    ISSUE GROUP =   2   ISSUE =   2   NPSW-SPRAY

     LEVEL 1 NO.<MED.=  8 NO. EXP.=  7     NO.>=MED.=  7 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
     LEVEL 2 NO.<MED.= 29 NO. EXP.= 30     NO.>=MED.= 31 NO. EXP.= 30    CHI-SQ.=    0.1 DF= 1 SIG.= 0.796
     LEVEL 3 NO.<MED.= 30 NO. EXP.= 30     NO.>=MED.= 30 NO. EXP.= 30    CHI-SQ.=    0.0 DF= 1 SIG.= 1.000
     LEVEL 4 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8    CHI-SQ.=    0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   0.3 DF=  7  SIG.= 1.000

0    ISSUE GROUP =   2   ISSUE =   3   VENT-SBO-NACR

     LEVEL 1 NO.<MED.=  9 NO. EXP.=  7     NO.>=MED.=  6 NO. EXP.=  8    CHI-SQ.=    1.1 DF= 1 SIG.= 0.301
     LEVEL 2 NO.<MED.= 26 NO. EXP.= 30     NO.>=MED.= 34 NO. EXP.= 30    CHI-SQ.=    1.1 DF= 1 SIG.= 0.302
     LEVEL 3 NO.<MED.= 33 NO. EXP.= 30     NO.>=MED.= 27 NO. EXP.= 30    CHI-SQ.=    0.6 DF= 1 SIG.= 0.439
     LEVEL 4 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8    CHI-SQ.=    0.3 DF= 1 SIG.= 0.605
     OVERALL CHI-SQ=   3.0 DF=  7  SIG.= 0.884

0    ISSUE GROUP =   2   ISSUE =   4   VENT-SBO-ACR

     LEVEL 1 NO.<MED.=  9 NO. EXP.=  7     NO.>=MED.=  6 NO. EXP.=  8    CHI-SQ.=    1.1 DF= 1 SIG.= 0.301
     LEVEL 2 NO.<MED.= 27 NO. EXP.= 30     NO.>=MED.= 33 NO. EXP.= 30    CHI-SQ.=    0.6 DF= 1 SIG.= 0.439
     LEVEL 3 NO.<MED.= 28 NO. EXP.= 30     NO.>=MED.= 32 NO. EXP.= 30    CHI-SQ.=    0.3 DF= 1 SIG.= 0.606
     LEVEL 4 NO.<MED.= 10 NO. EXP.=  7     NO.>=MED.=  5 NO. EXP.=  8    CHI-SQ.=    2.4 DF= 1 SIG.= 0.120
     OVERALL CHI-SQ=   4.3 DF=  7  SIG.= 0.739

0    ISSUE GROUP =   2   ISSUE =   5   SP BYPASS, SMALL/LARGE

     LEVEL 1 NO.<MED.= 62 NO. EXP.= 63     NO.>=MED.= 64 NO. EXP.= 63    CHI-SQ.=    0.0 DF= 1 SIG.= 0.859
     LEVEL 2 NO.<MED.= 12 NO. EXP.= 12     NO.>=MED.= 12 NO. EXP.= 12    CHI-SQ.=    0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   0.0 DF=  3  SIG.= 0.998

0    ISSUE GROUP =   2   ISSUE =   6   CONT FAILURE PRESS. (T<500F B VB)

     LEVEL 1 NO.<MED.=  1 NO. EXP.=  1     NO.>=MED.=  1 NO. EXP.=  1   TEST CANNOT BE RUN; EXP. NO. < 3
     LEVEL 2 NO.<MED.=  5 NO. EXP.=  5     NO.>=MED.=  6 NO. EXP.=  6    CHI-SQ.=    0.0 DF= 1 SIG.= 1.000
     LEVEL 3 NO.<MED.=  5 NO. EXP.= 10     NO.>=MED.= 15 NO. EXP.= 10    CHI-SQ.=    5.0 DF= 1 SIG.= 0.025
     LEVEL 4 NO.<MED.=  5 NO. EXP.=  4     NO.>=MED.=  4 NO. EXP.=  5    CHI-SQ.=    0.0 DF= 1 SIG.= 1.000
     LEVEL 5 NO.<MED.= 10 NO. EXP.= 11     NO.>=MED.= 12 NO. EXP.= 11    CHI-SQ.=    0.2 DF= 1 SIG.= 0.670
     LEVEL 6 NO.<MED.= 21 NO. EXP.= 19     NO.>=MED.= 17 NO. EXP.= 19    CHI-SQ.=    0.4 DF= 1 SIG.= 0.516
     LEVEL 7 NO.<MED.= 13 NO. EXP.= 10     NO.>=MED.=  7 NO. EXP.= 10    CHI-SQ.=    1.8 DF= 1 SIG.= 0.180
     LEVEL 8 NO.<MED.=  8 NO. EXP.=  8     NO.>=MED.=  8 NO. EXP.=  8    CHI-SQ.=    0.0 DF= 1 SIG.= 1.000
     LEVEL 9 NO.<MED.=  6 NO. EXP.=  6     NO.>=MED.=  6 NO. EXP.=  6    CHI-SQ.=    0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   7.4 DF= 15  SIG.= 0.946

0    ISSUE GROUP =   2   ISSUE =   7   LATE FAILURE LOCATION (800-1200 A VB)

     LEVEL 1 NO.<MED.=  2 NO. EXP.=  2     NO.>=MED.=  3 NO. EXP.=  3   TEST CANNOT BE RUN; EXP. NO. < 3
     LEVEL 2 NO.<MED.= 45 NO. EXP.= 47     NO.>=MED.= 49 NO. EXP.= 47    CHI-SQ.=    0.2 DF= 1 SIG.= 0.680
     LEVEL 3 NO.<MED.= 27 NO. EXP.= 25     NO.>=MED.= 24 NO. EXP.= 26    CHI-SQ.=    0.3 DF= 1 SIG.= 0.575
     OVERALL CHI-SQ=   0.5 DF=  3  SIG.= 0.922

0    ISSUE GROUP =   2   ISSUE =   8   CONT FAILURE SIZE, RAPID PRESS.
```

152

```
      LEVEL 1 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
      LEVEL 2 NO.<MED.= 67 NO. EXP.= 67     NO.>=MED.= 68 NO. EXP.= 68   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
      OVERALL CHI-SQ=   0.0 DF=  3  SIG.= 1.000

0     ISSUE GROUP =   2   ISSUE =   9   CONT FAILURE SIZE, SLOW PRESS.

      LEVEL 1 NO.<MED.= 37 NO. EXP.= 37     NO.>=MED.= 38 NO. EXP.= 38   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
      LEVEL 2 NO.<MED.= 37 NO. EXP.= 37     NO.>=MED.= 38 NO. EXP.= 38   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
      OVERALL CHI-SQ=   0.0 DF=  3  SIG.= 1.000

0     ISSUE GROUP =   2   ISSUE =  10   VB MODE, HIGH-P FLOW MELT

      LEVEL 1 NO.<MED.= 34 NO. EXP.= 37     NO.>=MED.= 41 NO. EXP.= 38   CHI-SQ.=   0.5 DF= 1 SIG.= 0.488
      LEVEL 2 NO.<MED.= 40 NO. EXP.= 37     NO.>=MED.= 35 NO. EXP.= 38   CHI-SQ.=   0.5 DF= 1 SIG.= 0.488
      OVERALL CHI-SQ=   1.0 DF=  3  SIG.= 0.811

0     ISSUE GROUP =   2   ISSUE =  11   CONT PRESS. BEFORE VB, LONG TERM TB

      LEVEL 1 NO.<MED.= 11 NO. EXP.=  8     NO.>=MED.=  5 NO. EXP.=  8   CHI-SQ.=   2.3 DF= 1 SIG.= 0.134
      LEVEL 2 NO.<MED.= 40 NO. EXP.= 40     NO.>=MED.= 40 NO. EXP.= 40   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
      LEVEL 3 NO.<MED.= 20 NO. EXP.= 25     NO.>=MED.= 30 NO. EXP.= 25   CHI-SQ.=   2.0 DF= 1 SIG.= 0.157
      LEVEL 4 NO.<MED.=  3 NO. EXP.=  2     NO.>=MED.=  1 NO. EXP.=  2   TEST CANNOT BE RUN; EXP. NO. < 3
      OVERALL CHI-SQ=   4.3 DF=  5  SIG.= 0.514

0     ISSUE GROUP =   2   ISSUE =  12   PRESSURE RISE AT VB

      LEVEL 1 NO.<MED.= 13 NO. EXP.= 15     NO.>=MED.= 17 NO. EXP.= 15   CHI-SQ.=   0.5 DF= 1 SIG.= 0.465
      LEVEL 2 NO.<MED.= 28 NO. EXP.= 22     NO.>=MED.= 17 NO. EXP.= 23   CHI-SQ.=   3.2 DF= 1 SIG.= 0.074
      LEVEL 3 NO.<MED.= 19 NO. EXP.= 19     NO.>=MED.= 19 NO. EXP.= 19   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
      LEVEL 4 NO.<MED.=  9 NO. EXP.= 11     NO.>=MED.= 13 NO. EXP.= 11   CHI-SQ.=   0.7 DF= 1 SIG.= 0.394
      LEVEL 5 NO.<MED.=  5 NO. EXP.=  7     NO.>=MED.= 10 NO. EXP.=  8   CHI-SQ.=   1.1 DF= 1 SIG.= 0.301
      OVERALL CHI-SQ=   5.5 DF=  9  SIG.= 0.786

0     ISSUE GROUP =   2   ISSUE =  13   DELTA P DUE TO SUMP WATER INTERACT.

      LEVEL 1 NO.<MED.= 27 NO. EXP.= 30     NO.>=MED.= 33 NO. EXP.= 30   CHI-SQ.=   0.6 DF= 1 SIG.= 0.439
      LEVEL 2 NO.<MED.= 40 NO. EXP.= 37     NO.>=MED.= 35 NO. EXP.= 38   CHI-SQ.=   0.5 DF= 1 SIG.= 0.488
      LEVEL 3 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
      OVERALL CHI-SQ=   1.1 DF=  5  SIG.= 0.956

0     ISSUE GROUP =   2   ISSUE =  14   PROB OF DRY DW MELT THROUGH

      LEVEL 1 NO.<MED.= 22 NO. EXP.= 37     NO.>=MED.= 53 NO. EXP.= 38   CHI-SQ.=  12.0 DF= 1 SIG.= 0.001
      LEVEL 2 NO.<MED.= 52 NO. EXP.= 37     NO.>=MED.= 23 NO. EXP.= 38   CHI-SQ.=  12.0 DF= 1 SIG.= 0.001
      OVERALL CHI-SQ=  24.0 DF=  3  SIG.= 0.000

0     ISSUE GROUP =   2   ISSUE =  15   PROB OF WET DW MELT THROUGH

      LEVEL 1 NO.<MED.= 30 NO. EXP.= 30     NO.>=MED.= 30 NO. EXP.= 30   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
      LEVEL 2 NO.<MED.= 44 NO. EXP.= 45     NO.>=MED.= 46 NO. EXP.= 45   CHI-SQ.=   0.0 DF= 1 SIG.= 0.833
```

```
     OVERALL CHI-SQ=   0.0 DF=  3  SIG.= 0.998

0    ISSUE GROUP =   2   ISSUE =  16   PROB OF DW M-THRU W/HI-P MELT EJECT

     LEVEL 1 NO.<MED.= 36 NO. EXP.= 37     NO.>=MED.= 39 NO. EXP.= 38   CHI-SQ.=   0.1 DF= 1 SIG.= 0.817
     LEVEL 2 NO.<MED.= 38 NO. EXP.= 37     NO.>=MED.= 37 NO. EXP.= 38   CHI-SQ.=   0.1 DF= 1 SIG.= 0.817
     OVERALL CHI-SQ=   0.1 DF=  3  SIG.= 0.991

0    ISSUE GROUP =   2   ISSUE =  H2 BURNS IN RB LEADING TO BP

     LEVEL 1 NO.<MED.=  7 NO. EXP.= 15     NO.>=MED.= 23 NO. EXP.= 15   CHI-SQ.=   8.5 DF= 1 SIG.= 0.003
     LEVEL 2 NO.<MED.= 67 NO. EXP.= 60     NO.>=MED.= 53 NO. EXP.= 60   CHI-SQ.=   1.6 DF= 1 SIG.= 0.201
     OVERALL CHI-SQ=  10.2 DF=  3  SIG.= 0.017

0    ISSUE GROUP =   3   ISSUE =   1   IN-VES RELEASE FROM FUEL

     LEVEL 1 NO.<MED.= 14 NO. EXP.= 17     NO.>=MED.= 20 NO. EXP.= 17   CHI-SQ.=   1.1 DF= 1 SIG.= 0.303
     LEVEL 2 NO.<MED.= 42 NO. EXP.= 37     NO.>=MED.= 32 NO. EXP.= 37   CHI-SQ.=   1.4 DF= 1 SIG.= 0.245
     LEVEL 3 NO.<MED.= 16 NO. EXP.= 19     NO.>=MED.= 23 NO. EXP.= 20   CHI-SQ.=   0.9 DF= 1 SIG.= 0.336
     LEVEL 4 NO.<MED.=  2 NO. EXP.=  1     NO.>=MED.=  1 NO. EXP.=  2   TEST CANNOT BE RUN; EXP. NO. < 3
     OVERALL CHI-SQ=   3.3 DF=  5  SIG.= 0.649

0    ISSUE GROUP =   3   ISSUE =   2   CSI DECOMP

     LEVEL 1 NO.<MED.= 16 NO. EXP.= 14     NO.>=MED.= 13 NO. EXP.= 15   CHI-SQ.=   0.6 DF= 1 SIG.= 0.457
     LEVEL 2 NO.<MED.= 26 NO. EXP.= 27     NO.>=MED.= 29 NO. EXP.= 28   CHI-SQ.=   0.1 DF= 1 SIG.= 0.787
     LEVEL 3 NO.<MED.= 23 NO. EXP.= 25     NO.>=MED.= 28 NO. EXP.= 26   CHI-SQ.=   0.3 DF= 1 SIG.= 0.575
     LEVEL 4 NO.<MED.=  9 NO. EXP.=  7     NO.>=MED.=  6 NO. EXP.=  8   CHI-SQ.=   1.1 DF= 1 SIG.= 0.301
     OVERALL CHI-SQ=   2.0 DF=  7  SIG.= 0.959

0    ISSUE GROUP =   3   ISSUE =   3   FRAC IN-VES RETENTION LEAKED, AT VB

     LEVEL 1 NO.<MED.= 10 NO. EXP.=  7     NO.>=MED.=  4 NO. EXP.=  7   CHI-SQ.=   2.6 DF= 1 SIG.= 0.109
     LEVEL 2 NO.<MED.= 29 NO. EXP.= 29     NO.>=MED.= 29 NO. EXP.= 29   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 3 NO.<MED.= 16 NO. EXP.= 18     NO.>=MED.= 20 NO. EXP.= 18   CHI-SQ.=   0.4 DF= 1 SIG.= 0.505
     LEVEL 4 NO.<MED.= 16 NO. EXP.= 17     NO.>=MED.= 19 NO. EXP.= 18   CHI-SQ.=   0.1 DF= 1 SIG.= 0.735
     LEVEL 5 NO.<MED.=  3 NO. EXP.=  3     NO.>=MED.=  4 NO. EXP.=  4   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   3.1 DF=  9  SIG.= 0.959

0    ISSUE GROUP =   3   ISSUE =   4   S POOL DF

     LEVEL 1 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 2 NO.<MED.= 40 NO. EXP.= 38     NO.>=MED.= 36 NO. EXP.= 38   CHI-SQ.=   0.2 DF= 1 SIG.= 0.646
     LEVEL 3 NO.<MED.= 14 NO. EXP.= 15     NO.>=MED.= 16 NO. EXP.= 15   CHI-SQ.=   0.1 DF= 1 SIG.= 0.715
     LEVEL 4 NO.<MED.= 10 NO. EXP.= 12     NO.>=MED.= 14 NO. EXP.= 12   CHI-SQ.=   0.7 DF= 1 SIG.= 0.414
     LEVEL 5 NO.<MED.=  3 NO. EXP.=  2     NO.>=MED.=  2 NO. EXP.=  3   TEST CANNOT BE RUN; EXP. NO. < 3
     OVERALL CHI-SQ=   1.0 DF=  7  SIG.= 0.995

0    ISSUE GROUP =   3   ISSUE =   5   S POOL DF, VOL I
```

```
     LEVEL 1 NO.<MED.=  3 NO. EXP.=  2     NO.>=MED.=  1 NO. EXP.=  2   TEST CANNOT BE RUN; EXP. NO. < 3
     LEVEL 2 NO.<MED.= 23 NO. EXP.= 17     NO.>=MED.= 12 NO. EXP.= 18   CHI-SQ.=   4.1 DF= 1 SIG.= 0.042
     LEVEL 3 NO.<MED.= 27 NO. EXP.= 23     NO.>=MED.= 19 NO. EXP.= 23   CHI-SQ.=   1.4 DF= 1 SIG.= 0.238
     LEVEL 4 NO.<MED.= 20 NO. EXP.= 25     NO.>=MED.= 30 NO. EXP.= 25   CHI-SQ.=   2.0 DF= 1 SIG.= 0.157
     LEVEL 5 NO.<MED.=  1 NO. EXP.=  7     NO.>=MED.= 14 NO. EXP.=  8   CHI-SQ.=   9.6 DF= 1 SIG.= 0.002
     OVERALL CHI-SQ=  17.2 DF=  7  SIG.= 0.016

0    ISSUE GROUP =   3   ISSUE =   6   REVOL FROM RPV (FRVOL)

     LEVEL 1 NO.<MED.=  1 NO. EXP.=  2     NO.>=MED.=  3 NO. EXP.=  2   TEST CANNOT BE RUN; EXP. NO. < 3
     LEVEL 2 NO.<MED.= 27 NO. EXP.= 23     NO.>=MED.= 20 NO. EXP.= 24   CHI-SQ.=   1.4 DF= 1 SIG.= 0.243
     LEVEL 3 NO.<MED.= 39 NO. EXP.= 38     NO.>=MED.= 37 NO. EXP.= 38   CHI-SQ.=   0.1 DF= 1 SIG.= 0.819
     LEVEL 4 NO.<MED.=  7 NO. EXP.= 11     NO.>=MED.= 16 NO. EXP.= 12   CHI-SQ.=   2.8 DF= 1 SIG.= 0.095
     OVERALL CHI-SQ=   4.2 DF=  5  SIG.= 0.521

0    ISSUE GROUP =   3   ISSUE =   7   CCI REL

     LEVEL 1 NO.<MED.= 12 NO. EXP.=  9     NO.>=MED.=  6 NO. EXP.=  9   CHI-SQ.=   2.0 DF= 1 SIG.= 0.157
     LEVEL 2 NO.<MED.= 33 NO. EXP.= 31     NO.>=MED.= 29 NO. EXP.= 31   CHI-SQ.=   0.3 DF= 1 SIG.= 0.611
     LEVEL 3 NO.<MED.= 23 NO. EXP.= 27     NO.>=MED.= 32 NO. EXP.= 28   CHI-SQ.=   1.2 DF= 1 SIG.= 0.281
     LEVEL 4 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
     OVERALL CHI-SQ=   3.7 DF=  7  SIG.= 0.815

0    ISSUE GROUP =   3   ISSUE =   8   RB DF

     LEVEL 1 NO.<MED.= 18 NO. EXP.= 12     NO.>=MED.=  7 NO. EXP.= 13   CHI-SQ.=   5.8 DF= 1 SIG.= 0.016
     LEVEL 2 NO.<MED.= 35 NO. EXP.= 29     NO.>=MED.= 23 NO. EXP.= 29   CHI-SQ.=   2.5 DF= 1 SIG.= 0.115
     LEVEL 3 NO.<MED.= 18 NO. EXP.= 26     NO.>=MED.= 34 NO. EXP.= 26   CHI-SQ.=   4.9 DF= 1 SIG.= 0.027
     LEVEL 4 NO.<MED.=  3 NO. EXP.=  7     NO.>=MED.= 12 NO. EXP.=  8   CHI-SQ.=   4.3 DF= 1 SIG.= 0.038
     OVERALL CHI-SQ=  17.5 DF=  7  SIG.= 0.015

0    ISSUE GROUP =   3   ISSUE =   9   REF BAY DF

     LEVEL 1 NO.<MED.=  7 NO. EXP.=  6     NO.>=MED.=  5 NO. EXP.=  6   CHI-SQ.=   0.3 DF= 1 SIG.= 0.564
     LEVEL 2 NO.<MED.= 16 NO. EXP.= 13     NO.>=MED.= 11 NO. EXP.= 14   CHI-SQ.=   1.3 DF= 1 SIG.= 0.248
     LEVEL 3 NO.<MED.= 23 NO. EXP.= 28     NO.>=MED.= 34 NO. EXP.= 29   CHI-SQ.=   1.8 DF= 1 SIG.= 0.185
     LEVEL 4 NO.<MED.= 28 NO. EXP.= 27     NO.>=MED.= 26 NO. EXP.= 27   CHI-SQ.=   0.1 DF= 1 SIG.= 0.785
     OVERALL CHI-SQ=   3.5 DF=  7  SIG.= 0.836

0    ISSUE GROUP =   3   ISSUE =  10   LATE RELEASE FRACT, IODINE

     LEVEL 1 NO.<MED.=  4 NO. EXP.=  3     NO.>=MED.=  3 NO. EXP.=  4   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 2 NO.<MED.= 24 NO. EXP.= 24     NO.>=MED.= 25 NO. EXP.= 25   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 3 NO.<MED.= 39 NO. EXP.= 36     NO.>=MED.= 34 NO. EXP.= 37   CHI-SQ.=   0.5 DF= 1 SIG.= 0.482
     LEVEL 4 NO.<MED.=  7 NO. EXP.= 10     NO.>=MED.= 14 NO. EXP.= 11   CHI-SQ.=   1.7 DF= 1 SIG.= 0.190
     OVERALL CHI-SQ=   2.2 DF=  7  SIG.= 0.947
```

```
CONSEQUENCE MEASURE:
 EARLY ILLNESS

 BASE CASE :
  PEACH BOTTOM LLH (MACCS)

 ISSUE LEVELS FOR EACH SAMPLE MEMBER, IN ORDER OF INCREASING RISK
        RISK  ISSUE LEVELS, FOR ALL ISSUES
             1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24  25  26  27  28  29  30  31  32
1.511E-08    2   2   2   1   1   2   3   3   4   1   6   3   2   2   2   1   2   1   2   2   2   2   2   2   2   2   4   3   3   2   2   2
2.539E-08    3   2   3   2   3   2   4   3   1   1   8   3   1   2   2   3   4   2   2   2   1   2   2   2   4   2   2   2   2   2   1   2
6.712E-08    2   1   2   2   1   4   1   3   3   1   3   3   1   2   2   2   2   2   2   1   2   2   1   2   2   3   4   3   2   1   4   3
7.157E-08    2   2   3   1   1   3   2   3   2   1   6   2   2   2   1   3   5   2   1   1   1   2   2   3   5   4   3   3   1   2   4   2
7.419E-08    3   2   2   1   3   3   3   2   3   1   5   3   2   2   2   1   2   3   2   2   2   2   2   1   4   2   4   3   2   2   4   1
8.818E-08    3   1   3   2   4   2   1   3   3   1   7   3   2   2   2   1   3   1   2   1   1   2   2   2   2   2   3   4   2   2   3   2
1.036E-07    3   2   3   2   1   2   3   2   2   1   7   2   2   2   1   3   1   2   2   1   1   1   3   3   2   2   1   2   2   2   4   3
1.048E-07    2   3   1   1   3   3   3   4   3   2   5   2   2   1   2   3   3   2   1   2   2   2   3   2   4   2   3   3   2   1   3   2
1.061E-07    3   3   3   1   1   1   2   2   3   1   4   3   2   1   2   2   2   2   2   1   2   2   3   1   2   2   2   3   1   2   4   3
1.104E-07    2   2   2   1   2   2   2   3   3   1   9   2   2   2   1   2   4   2   2   2   2   2   1   2   4   5   4   2   2   2   4   3
1.234E-07    3   3   2   2   3   3   3   1   1   1   9   3   2   1   1   1   3   2   2   1   2   2   1   3   2   3   4   2   2   1   2   1
1.274E-07    3   3   1   1   1   2   3   4   3   1   6   2   2   2   2   2   1   2   2   2   2   2   2   3   4   2   3   2   3   2   2   3
1.359E-07    3   3   2   1   1   2   3   3   2   1   6   2   2   1   2   2   2   2   2   2   2   2   2   4   3   2   4   4   1   1   1   2
1.894E-07    2   2   2   2   2   2   3   3   3   1   8   2   2   1   1   2   2   1   2   2   1   2   1   2   1   2   3   2   1   1   4   3
2.046E-07    2   2   2   1   4   2   2   3   2   1   7   3   2   1   2   1   1   2   2   2   1   2   2   3   4   2   3   3   3   2   4   4
2.198E-07    2   1   3   2   2   4   3   2   2   1   7   2   2   1   2   1   3   1   1   1   2   1   3   1   2   4   1   2   2   2   4   3
2.398E-07    1   3   3   1   2   3   2   1   3   1   6   2   2   2   2   3   5   3   2   1   1   2   2   4   4   3   4   3   3   1   1   3
2.435E-07    1   3   2   1   3   3   4   2   3   1   3   3   2   1   2   2   2   3   2   2   2   2   2   1   2   2   3   2   1   3   3   2
2.455E-07    2   3   3   1   1   3   2   3   3   2   7   2   2   2   1   2   2   2   2   2   1   2   2   3   4   1   3   3   2   3   4   3
2.570E-07    2   2   2   2   2   2   2   2   3   1   6   2   2   1   1   1   1   1   2   2   1   2   2   1   2   4   2   3   3   2   1   3
2.847E-07    2   2   3   2   3   4   2   3   3   1   6   2   2   1   2   4   1   2   2   2   1   1   2   4   2   2   3   2   1   2   3   2
2.869E-07    1   3   3   2   1   3   2   2   3   2   3   2   2   1   2   3   3   1   1   1   2   2   2   4   4   2   2   3   3   1   3   2
2.976E-07    3   3   2   1   2   2   2   3   2   1   6   2   2   1   2   2   1   1   2   1   2   2   1   2   2   2   3   3   2   3   3   2
3.118E-07    2   2   3   2   2   3   3   4   4   1   6   2   2   2   1   1   2   2   2   2   2   2   2   3   2   2   3   3   3   1   3   4
3.170E-07    2   2   2   1   2   4   3   3   2   1   8   2   2   2   2   3   2   1   2   2   1   2   3   1   3   2   4   4   3   1   3   4
3.217E-07    3   2   1   1   3   1   1   3   4   1   9   2   2   2   2   2   4   2   2   2   1   2   2   2   2   4   2   3   2   3   3   2
3.224E-07    2   3   3   1   3   2   2   3   4   2   8   2   2   1   2   3   2   1   2   1   1   2   2   2   2   4   4   2   2   2   4   2
3.401E-07    2   3   2   1   2   4   3   2   3   2   6   2   2   1   1   2   1   1   2   1   2   2   1   3   4   1   4   4   2   2   3   2
3.559E-07    3   2   3   1   1   3   3   4   2   1   5   3   2   1   1   2   3   2   1   2   1   2   3   3   1   2   3   3   1   3   4   3
3.695E-07    4   2   3   2   2   3   3   1   2   2   7   2   2   2   1   2   1   2   2   2   1   2   2   3   3   3   2   3   3   1   4   3
3.740E-07    3   2   1   1   2   2   3   2   1   1   1   3   2   1   1   1   2   1   1   2   1   2   2   4   3   4   4   3   2   1   3   3
3.865E-07    2   2   2   2   2   1   3   3   2   1   6   3   2   2   2   2   2   2   1   2   2   2   2   2   4   2   4   2   2   2   3   3
4.292E-07    4   3   3   1   3   2   3   1   3   2   6   3   2   2   2   3   3   1   2   2   2   2   1   1   3   2   2   2   3   2   2   2
4.814E-07    3   2   3   1   3   4   3   2   2   2   8   2   2   1   2   2   2   1   2   1   2   2   1   3   5   3   2   3   1   3   3   4
4.849E-07    3   3   1   1   2   3   4   3   3   1   3   3   2   2   1   2   2   1   1   2   1   2   2   2   2   2   2   3   3   1   4   3
5.125E-07    3   2   1   2   3   2   3   2   3   1   2   3   1   1   2   3   3   1   2   2   2   2   2   3   1   2   2   3   2   3   3   3
5.362E-07    3   2   3   1   2   2   3   3   4   1   6   2   2   2   1   4   4   2   2   1   2   2   3   3   3   2   3   2   3   2   3   4
5.530E-07    2   3   2   2   3   2   2   2   2   1   4   1   2   2   2   1   3   2   2   1   1   2   2   1   4   2   2   3   2   2   3   4
5.829E-07    2   1   4   1   3   2   3   1   3   1   6   2   2   2   2   2   2   3   1   2   2   2   2   3   2   2   3   3   1   3   2   3
5.862E-07    2   2   2   1   3   4   3   2   2   1   6   3   2   2   2   3   5   2   1   1   2   2   1   4   2   2   2   3   2   2   4   3
6.588E-07    3   3   1   2   2   3   2   2   1   1   6   1   1   1   1   4   3   2   2   2   2   2   2   1   3   1   4   2   1   3   4   2
6.669E-07    2   3   3   2   2   2   2   2   2   1   2   3   2   1   2   3   2   2   2   2   2   2   2   2   5   2   2   3   4   2   2   3
6.926E-07    3   3   4   2   2   3   2   3   2   1   7   2   1   1   1   2   1   2   2   1   1   2   2   4   3   2   2   1   2   3   2   3
6.993E-07    3   1   2   1   2   3   1   4   2   1   2   2   2   1   1   2   3   2   2   1   2   1   2   1   2   2   3   2   2   2   2   4
7.146E-07    4   3   3   1   2   3   3   3   2   1   6   2   2   1   2   2   2   1   2   1   2   2   2   3   3   4   2   3   3   2   2   3
7.761E-07    3   2   2   1   2   4   2   3   3   1   8   3   2   1   2   2   1   1   1   2   2   2   3   1   4   3   4   3   3   2   3   3
8.058E-07    3   3   2   1   3   3   1   1   4   1   5   3   2   1   2   2   3   1   2   2   2   2   2   3   1   2   4   3   3   1   2   3
8.360E-07    4   3   3   2   2   3   3   1   2   1   4   2   1   1   2   2   5   1   2   2   1   2   3   2   2   2   4   2   3   1   4   3
8.732E-07    2   3   1   2   3   3   2   3   2   1   4   2   2   2   1   2   2   2   2   1   1   2   3   3   2   3   3   3   4   1   3   2
9.128E-07    3   2   2   1   3   2   3   3   4   1   7   2   1   1   1   2   3   2   2   2   2   2   3   3   4   4   2   3   3   3   3   1
1.027E-06    3   3   2   1   2   1   2   3   3   1   2   2   2   2   2   2   3   2   2   1   1   2   1   2   3   3   4   3   2   4   4   3
1.079E-06    3   2   3   2   2   2   3   2   1   1   5   3   2   2   1   2   2   2   2   2 [illegible]  1   2   2   4   4   4   3   2   1   4   3
1.107E-06    2   2   4   1   4   2   3   3   3   1   6   2   2   2   1   3   2   2   2 [illegible] [illegible]  2   1   1   2   2   2   3   2   1   4   3
1.132E-06    3   2   4   1   3   3   3   2   3   2   2   2   2   2   1   3   3   1   2   2   1   2   3   1   4   3   5   1   2   3   4   3
1.143E-06    3   2   1   2   3   3   3   3   3   2   5   2   2   1   1   2   5   2   2   2   1   2   2   2   2   2   3   2   2   2   2   3
1.174E-06    1   1   3   2   2   3   4   2   2   1   2   2   2   2   2   1   3   2   1   2   1   1   2   2   3   3   3   2   2   3   2   3
1.185E-06    3   4   2   2   4   3   2   3   2   1   5   2   2   2   2   2   4   2   2   1   2   2   3   3   2   2   3   2   3   2   4   2
1.187E-06    3   2   3   1   3   3   2   2   2   1   7   3   2   1   2   3   4   3   1   1   1   2   2   2   2   3   5   3   2   3   2   3
1.293E-06    2   3   3   1   4   2   2   3   3   1   6   2   2   2   1   2   4   2   1   1   1   2   3   3   3   4   3   2   1   2   4   3
1.336E-06    2   1   3   2   2   1   2   3   4   1   5   2   2   2   1   2   2   3   1   2   2   2   2   3   1   2   3   3   4   2   4   2
1.337E-06    1   1   3   1   2   3   4   2   2   1   3   3   2   1   2   2   2   1   1   2   1   2   2   1   2   2   2   2   3   3   3   3
1.417E-06    3   1   2   1   2   3   2   2   2   2   5   2   2   1   2   2   3   2   2   1   2   2   3   2   2   4   3   3   3   3   3   4
1.429E-06    2   2   3   2   2   3   4   2   2   1   9   3   2   2   1   3   3   2   1   1   1   2   1   1   4   3   4   2   2   4   1   2
1.462E-06    3   1   2   2   1   2   1   2   1   1   8   3   2   1   2   3   4   2   2   2   1   2   3   2   3   1   2   2   4   4   4   3
1.469E-06    4   2   1   2   2   3   2   1   4   1   4   3   2   1   1   2   1   2   1   1   1   1   3   2   4   3   4   4   2   4   4   3
1.505E-06    2   3   3   2   2   3   2   2   4   2   9   2   2   1   1   3   2   2   1   1   2   2   2   1   1   2   3   4   2   2   3   3
1.523E-06    2   3   2   1   2   2   3   2   4   1   7   2   2   1   2   3   3   1   1   2   1   2   1   2   3   1   1   3   2   2   2   3
1.535E-06    1   3   3   2   3   2   3   3   4   1   7   3   2   2   2   2   2   2   1   1   2   2   3   2   3   2   4   2   2   2   2   2
1.560E-06    2   3   2   1   2   2   1   3   1   1   4   2   2   1   2   2   3   2   1   2   2   2   1   2   1   2   2   2   2   2   4   3
1.623E-06    1   2   2   2   4   4   1   2   2   1   2   2   2   1   2   2   1   1   2   2   2   1   1   2   5   5   4   1   3   2   3   2
1.653E-06    4   2   1   1   2   4   1   1   4   1   8   3   2   2   2   1   3   2   1   1   1   2   2   2   4   2   4   3   1   3   2   3
1.717E-06    3   2   2   1   1   1   3   2   2   1   5   2   2   2   1   3   4   2   1   2   1   2   2   2   3   3   5   2   2   2   4   4
1.902E-06    1   2   2   1   2   2   3   3   3   1   5   2   2   2   1   2   4   1   2   1   2   1   4   4   1   5   3   3   3   2   1   2
1.943E-06    3   3   2   2   2   2   3   3   3   2   6   2   1   2   2   3   2   1   1   1   1   2   2   3   1   3   3   2   2   3   3   3
1.956E-06    3   3   4   2   2   1   2   3   3   1   4   2   2   2   2   3   5   2   1   2   2   2   2   3   2   2   4   3   2   2   4   4
1.958E-06    2   3   2   1   2   1   2   3   1   1   5   3   2   2   1   2   1   1   2   2   1   2   2   1   2   5   2   4   1   2   2   2
```

```
2.000E-06  2  2  3  1  3  3  2  1  3  1  5  2  2  2  2  2  3  1  1  2  2  2  1  3  1  2  5  3  1  2  3  1
2.145E-06  2  4  3  1  4  2  2  2  3  2  7  3  2  2  1  2  1  2  2  1  2  2  3  2  1  3  2  2  4  1  2  3
2.159E-06  1  3  2  1  2  2  2  3  2  1  8  2  2  1  1  2  2  1  2  2  1  2  3  2  3  2  3  3  2  3  1  2
2.215E-06  2  1  2  2  3  3  2  1  2  2  6  2  2  1  1  2  3  1  2  2  2  2  2  2  3  1  4  2  3  3  3  1
2.284E-06  1  2  2  2  4  3  2  3  3  1  8  2  2  1  1  2  3  3  2  2  1  2  3  3  4  1  4  2  2  2  4  2
2.310E-06  2  3  2  1  3  2  3  3  1  2  5  2  1  2  2  2  2  2  1  2  2  2  2  1  4  3  3  3  3  2  4  2
2.401E-06  2  1  4  1  4  2  3  2  2  1  4  3  2  2  2  2  3  1  2  1  1  2  2  4  3  2  4  4  2  3  4  3
2.475E-06  2  3  4  2  2  3  1  2  3  1  6  3  2  2  2  2  2  1  1  2  1  2  2  4  2  2  3  2  4  2  4  2
2.546E-06  3  3  4  1  3  2  1  4  3  2  7  2  1  1  1  1  2  1  1  2  2  1  3  4  3  4  3  3  1  3  4  3
2.598E-06  2  3  3  1  3  2  3  2  3  1  7  2  1  1  2  3  2  1  1  1  1  2  2  3  3  2  4  3  2  2  4  4
2.841E-06  3  3  3  2  2  3  3  3  2  1  6  2  1  2  1  2  4  3  2  1  1  1  2  3  3  4  3  4  2  1  4  2
2.953E-06  2  3  3  1  3  3  2  1  1  1  7  2  2  1  1  2  2  2  2  2  2  2  2  2  1  1  3  3  3  2  3  3
3.125E-06  3  2  2  1  3  1  2  2  2  1  9  2  2  2  1  3  1  3  2  1  2  2  2  3  2  3  3  4  2  3  4  3
3.371E-06  4  2  4  2  1  3  3  2  3  1  6  3  2  1  2  3  1  2  2  2  1  2  1  3  1  4  4  4  3  4  3  2
3.411E-06  4  3  3  1  2  3  2  3  2  1  3  2  2  1  1  2  4  1  1  1  2  2  3  4  2  1  4  2  3  2  2  2
3.535E-06  4  3  3  2  3  3  2  4  3  2  3  3  2  1  2  3  2  2  1  1  1  1  3  2  4  4  2  3  2  3  3  3
3.692E-06  2  3  3  1  3  2  4  3  2  1  2  3  2  1  2  1  3  2  2  2  2  2  3  3  2  4  5  3  3  3  4  3
3.746E-06  3  3  2  1  4  1  2  2  2  1  9  2  2  1  2  2  4  1  1  2  1  2  2  2  2  2  3  3  1  3  4  2
3.761E-06  2  3  3  2  3  3  2  3  2  1  1  2  2  1  1  3  2  2  2  2  2  2  3  2  4  4  4  2  2  3  1  3
3.788E-06  3  3  2  2  2  2  3  2  2  1  8  2  2  1  2  2  2  2  2  2  2  2  3  2  2  2  5  3  3  3  4  3
4.051E-06  3  2  3  1  3  3  4  4  3  1  7  2  2  2  1  3  2  1  1  1  1  2  4  3  2  3  2  3  3  3  4  2
4.242E-06  3  2  3  1  4  1  3  3  2  1  6  2  2  1  1  2  4  2  1  1  2  2  3  3  5  4  2  3  2  3  3  3
4.417E-06  3  4  4  1  3  2  2  4  2  2  8  2  2  2  2  2  4  2  2  2  2  1  1  3  3  2  3  3  4  2  3  3
4.452E-06  2  3  4  2  3  3  3  2  3  2  3  2  2  2  2  2  1  1  1  2  2  2  2  3  5  1  4  3  1  3  3  2
4.471E-06  2  3  4  2  3  2  2  2  3  1  5  2  1  2  2  2  2  1  1  1  1  2  3  1  2  2  3  3  2  2  2  3
4.556E-06  3  2  2  1  3  3  3  4  2  1  6  2  2  1  2  3  1  2  1  1  1  2  3  3  3  1  5  3  3  1  3  4
4.921E-06  2  4  2  1  3  3  2  3  3  1  6  3  2  1  1  2  4  1  2  2  1  2  2  1  5  2  3  2  3  2  3  3
5.306E-06  2  3  1  1  3  2  3  3  3  1  7  3  2  2  1  3  2  1  2  2  2  1  2  2  2  2  4  3  2  3  3  2
5.392E-06  4  2  2  2  3  2  4  2  3  1  3  2  2  2  1  2  1  2  1  2  2  2  2  3  4  2  2  4  2  4  3  4
6.302E-06  3  2  3  1  3  2  2  3  1  1  5  2  2  2  2  3  1  2  1  1  2  1  1  2  2  3  5  1  2  1  1  4
7.004E-06  3  2  3  2  3  2  3  4  2  1  8  2  2  2  1  2  3  1  2  1  1  2  1  3  4  2  5  3  3  2  3  3
7.525E-06  2  2  2  2  3  1  1  3  1  1  2  2  2  1  1  3  3  1  1  2  2  2  1  2  3  2  2  3  2  4  4  2
9.629E-06  2  2  2  1  2  3  1  3  3  1  3  2  2  2  1  3  2  2  2  2  1  2  1  3  3  2  2  2  3  4  3  3
1.103E-05  3  3  2  2  2  2  2  3  2  1  3  3  2  2  2  2  3  1  1  1  1  1  2  4  3  2  2  3  2  4  2  3
1.143E-05  2  3  2  1  2  3  2  1  3  1  5  2  1  1  1  3  5  2  1  2  1  2  1  2  2  5  2  3  3  2  2  3
1.165E-05  1  1  2  1  2  2  4  2  2  2  6  2  2  2  1  2  4  1  1  1  2  2  2  3  4  3  4  4  4  4  3  3
1.248E-05  1  4  3  2  1  3  2  3  3  1  9  2  2  1  1  2  2  1  1  2  2  2  2  1  4  3  4  2  2  3  4  3
1.256E-05  1  2  2  2  2  2  3  2  2  1  4  3  2  2  1  3  2  2  1  2  1  2  2  1  3  1  2  3  4  3  4  2
1.279E-05  2  4  3  2  2  3  2  3  2  1  3  3  2  1  2  2  5  1  2  2  2  2  2  2  2  2  3  3  2  3  3  2
1.324E-05  4  2  3  1  4  2  3  4  3  2  6  2  1  1  2  2  3  2  1  1  2  2  2  1  2  2  4  2  4  2  1  3
1.336E-05  3  2  2  1  2  3  3  2  3  1  9  2  2  1  1  2  1  2  1  2  2  1  1  4  4  2  3  3  3  2  3  2
1.367E-05  2  2  2  2  2  3  3  2  2  1  9  2  2  2  1  2  3  2  1  2  2  2  2  3  1  3  5  3  3  3  4  4
1.437E-05  3  2  2  2  2  3  2  3  4  1  2  2  2  1  1  3  5  2  2  1  1  1  2  3  3  3  5  4  3  3  4  2
1.619E-05  3  2  3  1  2  3  1  2  2  2  2  2  2  2  1  2  2  2  1  2  1  1  3  2  2  1  3  2  3  3  2  2
1.665E-05  2  3  2  2  3  3  3  2  2  1  7  3  2  1  1  4  3  2  1  2  1  2  2  2  3  3  3  3  2  3  2  4
1.683E-05  3  3  2  1  3  2  2  2  2  1  7  3  2  1  1  3  1  3  1  2  1  2  3  1  3  4  4  4  2  3  3  1
1.707E-05  3  3  2  2  3  4  4  3  3  1  5  3  2  1  1  1  5  2  1  2  1  2  1  3  2  2  3  2  2  4  4  2
2.435E-05  3  2  3  1  3  2  2  2  2  1  3  2  2  2  2  3  3  2  2  2  1  2  2  3  4  2  1  4  3  3  3  3
2.727E-05  3  4  2  2  3  2  2  3  2  1  3  3  2  2  1  2  5  3  2  1  2  2  3  2  2  2  4  3  2  3  3  4
2.800E-05  2  3  4  1  4  4  3  3  3  1  3  3  2  2  2  3  1  1  1  1  2  2  1  2  4  4  3  2  3  2  4  3
2.929E-05  4  2  2  1  3  2  3  2  3  1  3  2  2  1  1  3  2  1  2  2  2  1  2  3  4  1  4  2  3  1  4  3
2.932E-05  2  1  3  1  3  1  3  3  3  1  3  2  2  2  1  2  4  1  2  2  1  1  1  1  3  2  5  4  2  1  2  3
3.490E-05  3  4  4  1  2  3  3  2  2  1  3  2  2  2  2  3  1  2  1  2  2  2  2  2  2  4  4  3  1  2  3  3
3.589E-05  3  4  3  1  2  2  2  2  3  1  6  3  2  2  2  3  5  1  1  2  1  2  2  2  4  2  5  3  2  2  3  4
3.608E-05  3  1  4  1  3  3  2  4  3  1  8  3  2  1  1  3  5  1  1  2  2  1  2  1  2  3  3  4  3  2  1  1
3.741E-05  2  2  1  1  3  2  2  4  1  1  6  2  2  2  2  3  3  1  1  1  2  2  2  3  2  2  2  3  4  3  3  3
3.743E-05  1  2  3  1  3  2  3  2  2  1  6  2  2  1  1  2  1  2  1  1  2  2  4  3  2  1  4  4  3  4  1  2
3.743E-05  2  2  3  2  3  1  2  2  3  1  8  2  2  1  1  2  4  1  1  1  2  1  2  1  2  2  4  4  3  1  3  3
3.853E-05  4  2  1  2  3  4  4  2  2  1  6  2  2  2  2  2  4  1  1  2  2  1  3  3  2  2  3  2  3  2  3  3
3.889E-05  3  2  3  2  3  2  2  3  3  1  3  2  2  1  2  2  1  3  1  1  2  2  1  3  3  3  4  4  4  3  4  2
4.374E-05  2  4  3  1  3  4  2  3  2  1  6  2  2  2  1  3  3  1  2  2  2  2  3  3  2  2  2  3  2  4  3  3
8.551E-05  3  4  3  1  4  3  3  1  3  2  6  2  2  1  1  2  4  1  2  2  1  1  2  2  2  3  4  3  2  4  4  4
9.307E-05  4  4  3  2  1  2  4  3  2  1  5  1  2  1  1  2  1  2  1  2  1  2  1  2  3  2  2  4  4  2  3  2
1.006E-04  2  3  2  1  2  3  3  3  2  1  8  1  2  1  2  2  4  3  1  1  1  2  1  3  3  2  4  3  4  3  4  3
1.007E-04  2  3  2  1  2  2  4  2  4  1  5  3  2  1  2  2  5  2  1  1  1  2  1  2  2  2  3  2  3  3  3  2
1.009E-04  1  3  1  1  2  3  2  2  3  1  5  1  2  2  2  2  2  1  1  1  1  1  1  2  2  2  4  4  3  1  3  2
1.010E-04  3  3  3  2  2  2  2  2  1  1  9  3  2  2  2  3  3  1  1  2  2  1  3  2  2  3  4  3  3  3  4  3
1.181E-04  2  2  2  1  4  2  3  2  1  1  9  2  2  1  2  3  1  1  1  1  1  1  2  4  4  2  3  2  3  3  4  2
1.344E-04  4  4  3  2  2  3  2  2  2  1  6  3  2  1  1  2  3  2  1  2  1  2  3  2  4  2  2  3  3  3  3  3
1.557E-04  3  3  3  2  3  1  3  1  2  1  3  3  2  2  1  3  3  2  1  2  2  1  3  1  4  3  5  2  3  3  3  2
1.568E-04  3  3  3  1  3  3  2  2  2  1  6  2  2  2  1  1  5  1  1  2  1  2  2  1  2  4  4  3  3  3  2  4
1.570E-04  2  3  2  1  3  2  3  2  3  1  7  2  2  2  1  2  1  3  1  2  1  2  3  3  2  4  4  2  3  4  2  2
1.828E-04  2  4  3  1  3  4  1  2  3  1  6  2  2  2  1  3  2  3  1  2  1  2  1  2  2  2  5  3  3  2  3  4
1.237E-03  2  4  2  1  2  3  4  4  3  1  5  3  2  1  1  3  1  2  1  1  1  1  1  2  3  4  4  2  4  3  3  3

     MEAN =      2.388E-05      VARIANCE =      1.114E-08

     PERCENTILES :
          5-TH =      1.048E-07  50-TH =      1.957E-06  95-TH =      1.011E-04
     LOGARITHMIC MIDPOINT (OF POINTS > 0.) =      4.323E-06
     NUMBER ABOVE MIDPOINT = 52
     NUMBER BELOW MIDPOINT =  98
     CHI-SQUARED(1) =      1.411E+01
     REJECT NULL (p < .01)
```

```
    CONSEQUENCE MEASURE:
     EARLY ILLNESS


     BASE CASE :
      PEACH BOTTOM LLH (MACCS)

     FRACTIONAL CONTRIBUTION OF EACH SEQUENCE TO MEAN RISK
                     SEQUENCE              CONTRIBUTION
                     TB                          0.2031
                     TBUX                        0.7639
                     TBU                         0.0142
                     TCSX                        0.0029
                     TCUX                        0.0005
                     TCSRX2                      0.0106
                     TCSRV23                     0.0048
1    CONSEQUENCE MEASURE:
     EARLY ILLNESS


     BASE CASE :
      PEACH BOTTOM LLH (MACCS)

     FRACTIONAL CONTRIBUTION OF EACH NONZERO BIN TO MEAN RISK
                        BIN                   CONTRIBUTION
              AAACACGGDABCBABBEDABBB              0.0001
              AAACACGGDABCBABBEEABBB              0.0001
              AAACACGGDABCBADBEDABBB              0.0001
              AAACACGGDABCBADBEEABBB              0.0001
              BAACAAGBDABCBBBBHHABBB              0.0001
              BAACAAGBFABCCBBBHHABBB              0.0001
              BAACACGBDAACBBBBHHABBB              0.0010
              BAACACGBDAACBDDBHHABBB              0.0005
              BAACACGBDABCBBBBHHABBB              0.0001
              BAACACGBDABCBDDBHHABBB              0.0001
              BAACACGBFAACCBBBHHABBB              0.0003
              BAACACGBFABCCBBBHHABBB              0.0001
              BAACACGGDAACBABBDDABBB              0.0001
              CAACAABGFDACBCCBADABAB              0.0001
              CAACACBGDDACBABBADABAB              0.0001
              CAACACBGDDACBABBAEABAB              0.0001
              CAACACBGDDACBCCBAABAAB              0.0001
              CAACACBGDDACBCDBADABAB              0.0001
              CAACACBGDDACBCDBAEABAB              0.0002
              CAACACBGDDACBCDBAFABAB              0.0001
              CAACACBGFDACBCCBACABAB              0.0001
              CAACACBGFDACBCCBADABAB              0.0001
              CAACACBGFDACBCDBACABAB              0.0001
              CAACACBGFDACBCDBADABAB              0.0001
              CAACACBGFDACBCDBAEABAB              0.0001
              CAACCCBGDDACBCDBADABAB              0.0001
              CAACCCBGDDACBCDBAEABAB              0.0001
              CAACCCBGFDACBCCBACABAB              0.0001
              CAACCCBGFDACBCCBADABAB              0.0001
              DAAAAAGBDABCBBBBHHABBB              0.0002
              DAAAAAGBDDACBBBBHHABBB              0.0003
              DAAAAAGBDDACBDDBHHABBB              0.0001
              DAAAAAGBFABCCBBBHHABBB              0.0001
              DAAAAAGBFDACCBBBHHABBB              0.0004
              DAAAAAGBFDACCDDBHHABBB              0.0002
              DAAAACGBDABCBBBBHHABBB              0.0001
              DAAAACGBDDACBBBBHHABBB              0.0009
              DAAAACGBDDACBDDBHHABBB              0.0007
              DAAAACGBFABCCBBBHHABBB              0.0001
              DAAAACGBFDACBDDBHHABAB              0.0001
              DAAAACGBFDACCBBBHHABBB              0.0010
              DAAAACGBFDACCDDBHHABBB              0.0012
              DAAAACGBFDACCDDBHHBABB              0.0001
              DAAAACGGDDACBBBBADABAB              0.0001
              DAAAACGGDDACBBBBAEABAB              0.0003
              DAAAACGGDDACBDDBACABAB              0.0001
              DAAAACGGDDACBDDBADABAB              0.0002
              DAAAACGGDDACBDDBAEABAB              0.0005
              DAAAACGGDDACBDDBAGABAB              0.0001
              DAAACCGBDDACBBBBHHABBB              0.0001
              DAAACCGBDDACBDDBHHABBB              0.0003
              DAAACCGBFDACCDDBHHABBB              0.0002
              DAAACCGGDDACBBBBADABAB              0.0001
              DAAACCGGDDACBBBBAEABAB              0.0001
              DAAACCGGDDACBDDBACABAB              0.0001
              DAAACCGGDDACBDDBADABAB              0.0001
              DAAACCGGDDACBDDBAEABAB              0.0001
              DABAAAGADABCBDDBHGABAB              0.0003
              DABAAAGADDACBBBBHGABAB              0.0003
              DABAAAGADDACBDDBHGABAB              0.0002
              DABAACGADABCBBBBHGABAB              0.0010
```

158

DABAACGADABCBDDBHGABAB	0.0001
DABAACGADDACBBBBHGABAB	0.0021
DABAACGADDACBDDBHGABAB	0.0005
DACAAAGADABCCBBBHHABBB	0.0001
DACAAAGADABCCDDBHHABBB	0.0001
EBAACCGGDDBCBABBEGABBB	0.0013
EBAACCGGDDBCBABBEGBBBB	0.0008
EBAACCGGDDBCBABBEHABBB	0.0017
EBAACCGGDDBCBABBEHBBBB	0.0036
EBAACCGGDDBCBADBEHABBB	0.0029
EBAACCGGDDBCBADBEHBBBB	0.0039
EBACBBGEFCBCCABBFEABBA	0.0001
EBACBBGGDCBCBABBFBBABA	0.0017
EBACBBGGDCBCBABBFCBABA	0.0002
EBACBBGGDCBCBABBFDABBA	0.0001
EBACBBGGDCBCBABBFEABBA	0.0001
EBACBCGGDCBCBABBFBBABA	0.0017
EBACBCGGDCBCBABBFCBABA	0.0002
EBACBCGGDCBCBABBFDABBA	0.0001
EBACBCGGDCBCBABBFEABBA	0.0002
EBACBCGGDCBCBABBFFABBA	0.0001
EBACBCGGDCBCBABBFFBBBA	0.0003
EBACBCGGDCBCBADBFBBABA	0.0004
EBACBCGGDCBCBADBFEABBA	0.0002
EBACCCDGFDBCBADBFBBABB	0.0012
EBACCCFGFDBBBADBFCBABB	0.0004
EBACCCFGFDBBBADBFEABBB	0.0001
EBACCCFGFDBCBABBFCBABB	0.0005
EBACCCFGFDBCBABBFEABBB	0.0017
EBACCCFGFDBCBACBFCBABB	0.0005
EBACCCFGFDBCBACBFEABBB	0.0001
EBACCCFGFDBCBADBFBBABB	0.0002
EBACCCFGFDBCBADBFCBABB	0.0065
EBACCCFGFDBCBADBFEABBB	0.0007
EBACCCFGFDBCBADBFEBBBB	0.0002
EBACCCFGFDBCBADBFFABBB	0.0001
EBACCCGEFDBCCABBFEABBB	0.0002
EBACCCGEFDBCCADBFCBABB	0.0030
EBACCCGEFDBCCADBFEBBBB	0.0004
EBACCCGGDDBBBABBFABABB	0.0002
EBACCCGGDDBBBABBFEABBB	0.0002
EBACCCGGDDBBBABBFFABBB	0.0001
EBACCCGGDDBBBABBFGABBB	0.0001
EBACCCGGDDBBBADBFABABB	0.0006
EBACCCGGDDBBBADBFCBABB	0.0001
EBACCCGGDDBCBABBFABABB	0.0402
EBACCCGGDDBCBABBFBBABB	0.1239
EBACCCGGDDBCBABBFCBABB	0.0288
EBACCCGGDDBCBABBFCBBBB	0.0003
EBACCCGGDDBCBABBFDABBB	0.0497
EBACCCGGDDBCBABBFDBBBB	0.0006
EBACCCGGDDBCBABBFEABBB	0.0126
EBACCCGGDDBCBABBFEBBBB	0.0159
EBACCCGGDDBCBABBFFABBB	0.0116
EBACCCGGDDBCBABBFFBBBB	0.0027
EBACCCGGDDBCBABBFGABBB	0.0052
EBACCCGGDDBCBADBFABABB	0.0676
EBACCCGGDDBCBADBFBBABB	0.2812
EBACCCGGDDBCBADBFCBABB	0.0022
EBACCCGGDDBCBADBFEABBB	0.0282
EBACCCGGDDBCBADBFEBBBB	0.0033
EBACCCGGDDBCBADBFFABBB	0.0247
EBACCCGGDDBCBADBFFBBBB	0.0339
EBACCCGGDDBCBADBFGABBB	0.0006
EBACCCGGEDBBBADBFEABBB	0.0002
EBACCCGGEDBCBABBFBBABB	0.0001
EBACCCGGEDBCBABBFCBABB	0.0014
EBACCCGGEDBCBABBFCBBBB	0.0002
EBACCCGGEDBCBABBFEABBB	0.0029
EBACCCGGEDBCBABBFEBBBB	0.0003
EBACCCGGEDBCBADBFCBABB	0.0016
EBACCCGGEDBCBADBFEABBB	0.0003
EBACCCGGEDBCBADBFEBBBB	0.0003
EBBBACGGDBBCBADBDGABBB	0.0001
EBBBACGGDBBCBADBEGABBB	0.0001
FCACCCDGFDBCBACBEBBABB	0.0001
FCACCCDGFDBCBADBDBBABB	0.0004
FCACCCDGFDBCBADBDCBABB	0.0001
FCACCCDGFDBCBADBDEABBB	0.0001
FCACCCDGFDBCBADBEBBABB	0.0007
FCACCCFGFDBCBABBGEABBB	0.0003
FCACCCFGFDBCBADBEEABBB	0.0002
FCACCCGBDDBCBABBHHBABB	0.0003
FCACCCGBDDBCBDDBHHABBB	0.0039
FCACCCGBDDBCBDDBHHBABB	0.0028
FCACCCGDFDBCBADBDCBABB	0.0002

FCACCCGGDDBBBABBEABABB	0.0001
FCACCCGGDDBBBABBECBABB	0.0008
FCACCCGGDDBBBABBEEABBB	0.0013
FCACCCGGDDBBBABBEEBBBB	0.0001
FCACCCGGDDBBBADBEBBABB	0.0001
FCACCCGGDDBCBABBCBBABB	0.0011
FCACCCGGDDBCBABBDABABB	0.0014
FCACCCGGDDBCBABBDBBABB	0.0069
FCACCCGGDDBCBABBDCBABB	0.0023
FCACCCGGDDBCBABBDDABBB	0.0003
FCACCCGGDDBCBABBDEABBB	0.0160
FCACCCGGDDBCBABBDEBBBB	0.0012
FCACCCGGDDBCBABBDFABBB	0.0003
FCACCCGGDDBCBABBDFBBBB	0.0001
FCACCCGGDDBCBABBDGABBB	0.0033
FCACCCGGDDBCBABBEABABB	0.0045
FCACCCGGDDBCBABBEBBABB	0.0200
FCACCCGGDDBCBABBECBABB	0.0018
FCACCCGGDDBCBABBEDABBB	0.0055
FCACCCGGDDBCBABBEEABBB	0.0125
FCACCCGGDDBCBABBEEBBBB	0.0005
FCACCCGGDDBCBABBEFABBB	0.0008
FCACCCGGDDBCBABBEFBBBB	0.0010
FCACCCGGDDBCBABBEGABBB	0.0003
FCACCCGGDDBCBABBGABABB	0.0001
FCACCCGGDDBCBABBGBBABB	0.0010
FCACCCGGDDBCBABBGCBABB	0.0095
FCACCCGGDDBCBABBGEABBB	0.0001
FCACCCGGDDBCBACBEABABB	0.0002
FCACCCGGDDBCBADBDABABB	0.0031
FCACCCGGDDBCBADBDBBABB	0.0093
FCACCCGGDDBCBADBDCBABB	0.0129
FCACCCGGDDBCBADBDEABBB	0.0029
FCACCCGGDDBCBADBDEBBBB	0.0009
FCACCCGGDDBCBADBDFABBB	0.0010
FCACCCGGDDBCBADBDGABBB	0.0274
FCACCCGGDDBCBADBEABABB	0.0055
FCACCCGGDDBCBADBEBBABB	0.0038
FCACCCGGDDBCBADBECBABB	0.0157
FCACCCGGDDBCBADBEEABBB	0.0095
FCACCCGGDDBCBADBEEBBBB	0.0012
FCACCCGGDDBCBADBEFABBB	0.0027
FCACCCGGDDBCBADBEFBBBB	0.0003
FCACCCGGDDBCBADBGCBABB	0.0001
FCACCCGGDDBCBADBGEABBB	0.0003
FCACCCGGDDBCBDDBHABABB	0.0002
FCACCCGGEDBCBABBDEABBB	0.0001
FCACCCGGEDBCBABBEEABBB	0.0007
FCACCCGGEDBCBABBGEABBB	0.0001
FCACCCGGEDBCBADBCFABBB	0.0001
FCBBAAGCDBBBBBBBHHABBB	0.0001
FCBBAAGCDBBCBBBBHHABBB	0.0001
FCBBACGCDBBBBBBBHHABBB	0.0001
FCBBACGCDBBCBBBBHHABBB	0.0002
FCBBACGCFBBCCDDBHHABBB	0.0001
FCBBACGGDBBCBABBEGABBB	0.0001
FCBBACGGDBBCBADBEGABBB	0.0001
FCCBAAGCFBBBCBBBHHABBB	0.0002
FCCBAAGCFBBBCDDBHHABBB	0.0001
FCCBAAGCFBBCCBBBHHABBB	0.0005
FCCBAAGCFBBCCDDBHHABBB	0.0003

160

```
CONSEQUENCE MEASURE:
 EARLY ILLNESS


 BASE CASE :
  PEACH BOTTOM LLH (MACCS)

 FRACTIONAL CONTRIBUTIONS OF EACH RELEASE TO MEAN RISK
                RELEASE                  CONTRIBUTION
                PCH   1D                    0.0000
                PCH   2D                    0.0000
                PCH   3D                    0.0005
                PCH   4D                    0.0011
                PCH   5D                    0.0079
                PCH   6D                    0.0460
                PCH   7D                    0.0223
                PCH   8D                    0.1761
                PCH   9D                    0.7272
                PCH  10D                    0.0000
                PCH  11D                    0.0000
                PCH  12D                    0.0001
                PCH  13D                    0.0000
                PCH  14D                    0.0000
                PCH  15D                    0.0000
                PCH  16D                    0.0003
                PCH  17D                    0.0000
                PCH  18D                    0.0000
                PCH  19D                    0.0002
                PCH  20D                    0.0000
                PCH  21D                    0.0001
                PCH  22D                    0.0001
                PCH  23D                    0.0002
                PCH  24D                    0.0013
                PCH  25D                    0.0000
                PCH  26D                    0.0001
                PCH  27D                    0.0006
                PCH  28D                    0.0008
                PCH  29D                    0.0008
                PCH  30D                    0.0005
                PCH  31D                    0.0005
                PCH  32D                    0.0003
                PCH  33D                    0.0000
                PCH  34D                    0.0004
                PCH  35D                    0.0000
                PCH  36D                    0.0010
                PCH  37D                    0.0006
                PCH  38D                    0.0009
                PCH  39D                    0.0004
                PCH  40D                    0.0002
                PCH  41D                    0.0003
                PCH  42D                    0.0017
                PCH  43D                    0.0001
                PCH  44D                    0.0004
                PCH  45D                    0.0004
                PCH  46D                    0.0010
                PCH  47D                    0.0006
                PCH  48D                    0.0010
                PCH  49D                    0.0001
                PCH  50D                    0.0026
                PCH  51D                    0.0003
                PCH  52D                    0.0005
                PCH  53D                    0.0003
                PCH  54D                    0.0000
```

```
CONSEQUENCE MEASURE:
 EARLY ILLNESS

 SENSITIVITY OF RISK TO ISSUES
 DISTRIBUTION OF RISK AT EACH LEVEL OF EACH ISSUE
 BASE CASE :
  PEACH BOTTOM LLH (MACCS)

GP ISS LVL NUM     5%          50%         MEAN         95%        R**2    F   DF       SIGNIF.
 1   1   1  15  0.2407E-06  0.1902E-05  0.1252E-04  0.7875E-04   0.01    0.6( 3,146)   0.65NS
         3  60  0.9560E-07  0.1584E-05  0.1427E-04  0.9296E-04
         4  15  0.3836E-06  0.3411E-05  0.2198E-04  0.1226E-03
         2  60  0.8661E-07  0.2071E-05  0.3680E-04  0.1362E-03
 1   2   1  15  0.7186E-07  0.1337E-05  0.6004E-05  0.3426E-04   0.13    7.0( 3,146)   0.00**
         2  60  0.7287E-07  0.1544E-05  0.8789E-05  0.3798E-04
         3  60  0.1254E-06  0.1957E-05  0.1753E-04  0.1254E-03
         4  15  0.1374E-05  0.3490E-04  0.1275E-03  0.7669E-03
 1   3   4  15  0.6086E-06  0.2546E-05  0.8573E-05  0.3578E-04   0.02    0.7( 3,146)   0.53NS
         1  15  0.1100E-06  0.8732E-06  0.1266E-04  0.7932E-04
         3  60  0.9560E-07  0.2071E-05  0.2130E-04  0.1447E-03
         2  60  0.9051E-07  0.1951E-05  0.3308E-04  0.1091E-03
 1   4   2  62  0.9716E-07  0.1776E-05  0.1317E-04  0.9618E-04   0.00    0.1( 1,148)   0.74NS
         1  88  0.1059E-06  0.2071E-05  0.3142E-04  0.1215E-03
 1   5   1  15  0.2193E-07  0.2455E-06  0.7574E-05  0.5632E-04   0.09    4.9( 3,146)   0.00**
         4  15  0.1088E-06  0.2284E-05  0.1768E-04  0.1089E-03
         3  60  0.1137E-06  0.3726E-05  0.1970E-04  0.1563E-03
         2  60  0.2296E-06  0.1514E-05  0.3368E-04  0.1010E-03
 2   1   2  60  0.9560E-07  0.2152E-05  0.1567E-04  0.1009E-03   0.00    0.2( 3,146)   0.90NS
         1  15  0.1400E-06  0.1958E-05  0.1666E-04  0.1090E-03
         4  15  0.9028E-07  0.7761E-06  0.2110E-04  0.1278E-03
         3  60  0.1137E-06  0.2105E-05  0.3458E-04  0.1164E-03
 2   2   3  60  0.1042E-06  0.1529E-05  0.1517E-04  0.1090E-03   0.02    1.0( 3,146)   0.40NS
         1  15  0.7186E-07  0.1623E-05  0.1530E-04  0.9972E-04
         2  60  0.1503E-06  0.2187E-05  0.1543E-04  0.1010E-03
         4  15  0.4468E-07  0.4051E-05  0.1011E-03  0.6608E-03
 2   3   3  60  0.6931E-07  0.1548E-05  0.8551E-05  0.4124E-04   0.03    1.7( 3,146)   0.16NS
         1  15  0.1457E-06  0.1469E-05  0.1776E-04  0.1341E-03
         2  60  0.1527E-06  0.2536E-05  0.2418E-04  0.1452E-03
         4  15  0.1100E-06  0.4051E-05  0.9009E-04  0.5158E-03
 2   4   4  15  0.3220E-07  0.1336E-05  0.8491E-05  0.6192E-04   0.02    1.0( 3,146)   0.38NS
         2  60  0.1667E-06  0.2611E-05  0.1715E-04  0.1163E-03
         1  15  0.3770E-07  0.1958E-05  0.1886E-04  0.1136E-03
         3  60  0.9613E-07  0.2214E-05  0.3570E-04  0.1259E-03
 2   5   2  24  0.1902E-06  0.1710E-05  0.6580E-05  0.2667E-04   0.01    1.0( 1,148)   0.31NS
         1 126  0.1003E-06  0.1979E-05  0.2717E-04  0.1212E-03
 2   6   1   2************************  0.2068E-05************   0.05    0.9( 8,141)   0.51NS
         4   9  0.1061E-06  0.1469E-05  0.2480E-05  0.1256E-04
         2  11  0.5193E-06  0.1174E-05  0.4419E-05  0.1609E-04
         7  20  0.9560E-07  0.1529E-05  0.1086E-04  0.5141E-04
         8  16  0.4640E-07  0.1890E-05  0.1244E-04  0.7479E-04
         3  20  0.1278E-06  0.1031E-04  0.2102E-04  0.7783E-04
         6  38  0.9014E-07  0.1585E-05  0.2138E-04  0.1474E-03
         9  12  0.1117E-06  0.3422E-05  0.2242E-04  0.1163E-03
         5  22  0.9127E-07  0.1930E-05  0.7220E-04  0.2750E-03
 2   7   2  94  0.1291E-06  0.2078E-05  0.1378E-04  0.7478E-04   0.01    0.9( 2,147)   0.39NS
         3  51  0.6745E-07  0.1535E-05  0.3903E-04  0.1325E-03
         1   5  0.5530E-06  0.9307E-04  0.5916E-04  0.1009E-03
 2   8   1  15  0.3237E-07  0.1943E-05  0.3005E-05  0.1276E-04   0.01    1.1( 1,148)   0.30NS
         2 135  0.1071E-06  0.1958E-05  0.2619E-04  0.1136E-03
 2   9   2  75  0.7222E-07  0.1956E-05  0.1757E-04  0.1398E-03   0.00    0.0( 1,148)   0.91NS
         1  75  0.1477E-06  0.2159E-05  0.3018E-04  0.1007E-03
 2  10   2  75  0.7746E-07  0.1462E-05  0.1176E-04  0.1007E-03   0.04    5.4( 1,148)   0.01**
         1  75  0.1374E-06  0.2953E-05  0.3599E-04  0.1565E-03
 2  11   4   4************************  0.4532E-05************   0.07    3.6( 3,146)   0.02 *
         1  16  0.2435E-07  0.3415E-06  0.1157E-04  0.8062E-04
         2  80  0.1316E-06  0.2071E-05  0.1483E-04  0.1007E-03
         3  50  0.1036E-06  0.3452E-05  0.4384E-04  0.1557E-03
 2  12   2  45  0.7235E-07  0.1337E-05  0.9339E-05  0.3990E-04   0.05    1.8( 4,145)   0.14NS
         4  22  0.6133E-07  0.3113E-05  0.1529E-04  0.9126E-04
         3  38  0.1119E-06  0.1542E-05  0.1566E-04  0.1199E-03
         5  15  0.9683E-07  0.1279E-04  0.2782E-04  0.1404E-03
         1  30  0.1274E-06  0.3246E-05  0.6041E-04  0.1570E-03
 2  13   1  60  0.2040E-06  0.2438E-05  0.1677E-04  0.1010E-03   0.02    1.5( 2,147)   0.23NS
         2  75  0.1039E-06  0.1469E-05  0.2719E-04  0.9877E-04
         3  15  0.9947E-07  0.2841E-05  0.3569E-04  0.1760E-03
 2  14   2  75  0.7746E-07  0.8732E-06  0.4826E-05  0.2877E-04   0.20   36.8( 1,148)   0.00**
         1  75  0.3028E-06  0.4471E-05  0.4292E-04  0.1565E-03
 2  15   2  90  0.1104E-06  0.2078E-05  0.1769E-04  0.1344E-03   0.00    0.1( 1,148)   0.75NS
         1  60  0.9560E-07  0.1774E-05  0.3316E-04  0.1008E-03
 2  16   2  75  0.1051E-06  0.1956E-05  0.1090E-04  0.3880E-04   0.00    0.5( 1,148)   0.47NS
         1  75  0.1205E-06  0.1958E-05  0.3685E-04  0.1509E-03
 2  17   2 120  0.9613E-07  0.1529E-05  0.1270E-04  0.9677E-04   0.07   11.4( 1,148)   0.00**
         1  30  0.2198E-06  0.8339E-05  0.6858E-04  0.1557E-03
 3   1   2  74  0.7680E-07  0.1578E-05  0.1064E-04  0.3743E-04   0.03    1.5( 3,146)   0.22NS
         4   3************************  0.1446E-04************
         3  39  0.1054E-06  0.2159E-05  0.1913E-04  0.1457E-03
         1  34  0.1129E-06  0.3858E-05  0.5895E-04  0.1623E-03
 3   2   4  15  0.1566E-06  0.1902E-05  0.1052E-04  0.6848E-04    0.01     0.4(  3,146)   0.73NS
         3  51  0.1236E-06  0.2598E-05  0.1261E-04  0.4348E-04
         1  29  0.1042E-06  0.1429E-05  0.1707E-04  0.1558E-03
         2  55  0.7186E-07  0.1717E-05  0.4155E-04  0.1251E-03
 3   3   5   7  0.7157E-07  0.1623E-05  0.2351E-05  0.4921E-05    0.02     0.7(  4,145)   0.61NS
         1  14  0.2149E-06  0.1723E-05  0.2446E-05  0.1033E-04
         4  35  0.8088E-07  0.1469E-05  0.1710E-04  0.1301E-03
         2  58  0.9407E-07  0.2781E-05  0.2253E-04  0.1315E-03
         3  36  0.3319E-06  0.2306E-05  0.4514E-04  0.9829E-04
 3   4   5   5  0.1104E-06  0.1902E-05  0.3404E-05  0.1143E-04    0.01     0.4(  4,145)   0.81NS
         1  15  0.2664E-06  0.2953E-05  0.7971E-05  0.3520E-04
         2  76  0.9256E-07  0.1548E-05  0.1665E-04  0.1009E-03
         3  30  0.1234E-06  0.2041E-05  0.1727E-04  0.1010E-03
         4  24  0.1570E-06  0.2689E-05  0.6923E-04  0.2916E-03
 3   5   1   4************************  0.6548E-05************    0.06     2.5(  4,145)   0.05 *
         3  46  0.1012E-06  0.1692E-05  0.9817E-05  0.4670E-04
         2  35  0.1323E-06  0.1337E-05  0.1129E-04  0.7706E-04
         5  15  0.1146E-05  0.6302E-05  0.3088E-04  0.1756E-03
         4  50  0.7419E-07  0.2250E-05  0.4491E-04  0.1568E-03
 3   6   1   4************************  0.2438E-05************    0.03     1.6(  3,146)   0.19NS
         3  76  0.8229E-07  0.1929E-05  0.1491E-04  0.1009E-03
         4  23  0.1168E-06  0.5392E-05  0.2014E-04  0.9574E-04
         2  47  0.1094E-06  0.1535E-05  0.4203E-04  0.1559E-03
 3   7   1  18  0.8377E-07  0.6197E-06  0.3092E-05  0.1532E-04    0.12     6.4(  3,146)   0.00**
         2  62  0.8229E-07  0.1514E-05  0.6343E-05  0.3179E-04
         3  55  0.2129E-06  0.3692E-05  0.2863E-04  0.1565E-03
         4  15  0.7134E-06  0.1165E-04  0.1038E-03  0.6606E-03
 3   8   1  25  0.9375E-07  0.8058E-06  0.8820E-05  0.4796E-04    0.15     8.4(  3,146)   0.00**
         2  58  0.7261E-07  0.1514E-05  0.9553E-05  0.3753E-04
         4  15  0.1115E-05  0.9629E-05  0.2632E-04  0.1349E-03
         3  52  0.2999E-06  0.3754E-05  0.4638E-04  0.1535E-03
 3   9   1  12  0.3002E-07  0.2027E-05  0.8580E-05  0.3729E-04    0.02     1.1(  3,146)   0.36NS
         4  54  0.7932E-07  0.1637E-05  0.1178E-04  0.9740E-04
         2  27  0.9006E-07  0.1523E-05  0.1569E-04  0.1568E-03
         3  57  0.2572E-06  0.3535E-05  0.4243E-04  0.1479E-03
 3  10   1   7  0.7419E-07  0.2000E-05  0.8320E-05  0.3608E-04    0.01     0.3(  3,146)   0.79NS
         2  49  0.6796E-07  0.2284E-05  0.1934E-04  0.1197E-03
         4  21  0.2580E-06  0.2598E-05  0.2598E-04  0.1680E-03
         3  73  0.1128E-06  0.1523E-05  0.2781E-04  0.8880E-04
 3  11   2  75  0.9182E-07  0.2159E-05  0.1456E-04  0.9112E-04    0.00     0.6(  1,148)   0.43NS
         1  75  0.1102E-06  0.1523E-05  0.3319E-04  0.1453E-03
 3  12   2  50  0.7419E-07  0.1432E-05  0.8508E-05  0.3743E-04    0.02     1.5(  2,147)   0.24NS
         3  50  0.1048E-06  0.1465E-05  0.2153E-04  0.1557E-03
         1  50  0.2046E-06  0.2689E-05  0.4159E-04  0.1344E-03
 3  13   1  38  0.7780E-07  0.1757E-05  0.9903E-05  0.6465E-04    0.01     0.7(  3,146)   0.58NS
         4  37  0.1040E-06  0.1943E-05  0.1579E-04  0.1117E-03
         3  38  0.1307E-06  0.1833E-05  0.1845E-04  0.1198E-03
         2  37  0.1030E-06  0.2310E-05  0.5188E-04  0.1733E-03
 3  14   4  30  0.2198E-06  0.1979E-05  0.8705E-05  0.3743E-04    0.01     0.2(  4,145)   0.93NS
         3  30  0.7419E-07  0.2753E-05  0.1184E-04  0.4374E-04
         5  30  0.7157E-07  0.1566E-05  0.1749E-04  0.1181E-03
         2  30  0.1061E-06  0.1427E-05  0.2447E-04  0.1344E-03
         1  30  0.8818E-07  0.2980E-05  0.5687E-04  0.1828E-03
NS=NOT SIGNIFICANT, *=SIGNIFICANT (P<.05), **=SIGNIFICANT (P<.01)
```

```
       CONSEQUENCE MEASURE:  EARLY ILLNESS
 0     ISSUE GROUP =   1    ISSUE =   1   SLC FAILURE TO ACTUATE

       LEVEL 1 NO.<MED.=  8 NO. EXP.=  7     NO.>=MED.=  7 NO. EXP.=  8    CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
       LEVEL 2 NO.<MED.= 28 NO. EXP.= 30     NO.>=MED.= 32 NO. EXP.= 30    CHI-SQ.=   0.3 DF= 1 SIG.= 0.606
       LEVEL 3 NO.<MED.= 32 NO. EXP.= 30     NO.>=MED.= 28 NO. EXP.= 30    CHI-SQ.=   0.3 DF= 1 SIG.= 0.606
       LEVEL 4 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8    CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
       OVERALL CHI-SQ=   1.1 DF=  7  SIG.= 0.994

 0     ISSUE GROUP =   1    ISSUE =   2   DC COMMON MODE

       LEVEL 1 NO.<MED.= 10 NO. EXP.=  7     NO.>=MED.=  5 NO. EXP.=  8    CHI-SQ.=   2.4 DF= 1 SIG.= 0.120
       LEVEL 2 NO.<MED.= 34 NO. EXP.= 30     NO.>=MED.= 26 NO. EXP.= 30    CHI-SQ.=   1.1 DF= 1 SIG.= 0.302
       LEVEL 3 NO.<MED.= 29 NO. EXP.= 30     NO.>=MED.= 31 NO. EXP.= 30    CHI-SQ.=   0.1 DF= 1 SIG.= 0.796
       LEVEL 4 NO.<MED.=  1 NO. EXP.=  7     NO.>=MED.= 14 NO. EXP.=  8    CHI-SQ.=   9.6 DF= 1 SIG.= 0.002
       OVERALL CHI-SQ=  13.2 DF=  7  SIG.= 0.068

 0     ISSUE GROUP =   1    ISSUE =   3   FAILURE TO VENT

       LEVEL 1 NO.<MED.= 11 NO. EXP.=  7     NO.>=MED.=  4 NO. EXP.=  8    CHI-SQ.=   4.3 DF= 1 SIG.= 0.038
       LEVEL 2 NO.<MED.= 30 NO. EXP.= 30     NO.>=MED.= 30 NO. EXP.= 30    CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
       LEVEL 3 NO.<MED.= 29 NO. EXP.= 30     NO.>=MED.= 31 NO. EXP.= 30    CHI-SQ.=   0.1 DF= 1 SIG.= 0.796
       LEVEL 4 NO.<MED.=  4 NO. EXP.=  7     NO.>=MED.= 11 NO. EXP.=  8    CHI-SQ.=   2.4 DF= 1 SIG.= 0.120
       OVERALL CHI-SQ=   6.8 DF=  7  SIG.= 0.454

 0     ISSUE GROUP =   1    ISSUE =   4   SW MOD A VS. MOD B

       LEVEL 1 NO.<MED.= 42 NO. EXP.= 44     NO.>=MED.= 46 NO. EXP.= 44    CHI-SQ.=   0.2 DF= 1 SIG.= 0.670
       LEVEL 2 NO.<MED.= 32 NO. EXP.= 31     NO.>=MED.= 30 NO. EXP.= 31    CHI-SQ.=   0.1 DF= 1 SIG.= 0.799
       OVERALL CHI-SQ=   0.2 DF=  3  SIG.= 0.970

 0     ISSUE GROUP =   1    ISSUE =   5   POWER RECOVERY

       LEVEL 1 NO.<MED.= 12 NO. EXP.=  7     NO.>=MED.=  3 NO. EXP.=  8    CHI-SQ.=   6.7 DF= 1 SIG.= 0.010
       LEVEL 2 NO.<MED.= 35 NO. EXP.= 30     NO.>=MED.= 25 NO. EXP.= 30    CHI-SQ.=   1.7 DF= 1 SIG.= 0.197
       LEVEL 3 NO.<MED.= 21 NO. EXP.= 30     NO.>=MED.= 39 NO. EXP.= 30    CHI-SQ.=   5.4 DF= 1 SIG.= 0.020
       LEVEL 4 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8    CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
       OVERALL CHI-SQ=  14.0 DF=  7  SIG.= 0.051

 0     ISSUE GROUP =   2    ISSUE =   1   PROB. OF STUCK OPEN VAC. BRKR.

       LEVEL 1 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8    CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
       LEVEL 2 NO.<MED.= 29 NO. EXP.= 30     NO.>=MED.= 31 NO. EXP.= 30    CHI-SQ.=   0.1 DF= 1 SIG.= 0.796
       LEVEL 3 NO.<MED.= 29 NO. EXP.= 30     NO.>=MED.= 31 NO. EXP.= 30    CHI-SQ.=   0.1 DF= 1 SIG.= 0.796
       LEVEL 4 NO.<MED.= 10 NO. EXP.=  7     NO.>=MED.=  5 NO. EXP.=  8    CHI-SQ.=   2.4 DF= 1 SIG.= 0.120
       OVERALL CHI-SQ=   2.8 DF=  7  SIG.= 0.902

 0     ISSUE GROUP =   2    ISSUE =   2   HPSW-SPRAY

       LEVEL 1 NO.<MED.=  9 NO. EXP.=  7     NO.>=MED.=  6 NO. EXP.=  8    CHI-SQ.=   1.1 DF= 1 SIG.= 0.301
       LEVEL 2 NO.<MED.= 25 NO. EXP.= 30     NO.>=MED.= 35 NO. EXP.= 30   CHI-SQ.=   1.7 DF= 1 SIG.= 0.197
       LEVEL 3 NO.<MED.= 34 NO. EXP.= 30     NO.>=MED.= 26 NO. EXP.= 30   CHI-SQ.=   1.1 DF= 1 SIG.= 0.302
       LEVEL 4 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
       OVERALL CHI-SQ=   4.1 DF=  7  SIG.= 0.771

 0     ISSUE GROUP =   2   ISSUE =   3   VENT-SBO-NACR

       LEVEL 1 NO.<MED.=  9 NO. EXP.=  7     NO.>=MED.=  6 NO. EXP.=  8   CHI-SQ.=   1.1 DF= 1 SIG.= 0.301
       LEVEL 2 NO.<MED.= 27 NO. EXP.= 30     NO.>=MED.= 33 NO. EXP.= 30   CHI-SQ.=   0.6 DF= 1 SIG.= 0.439
       LEVEL 3 NO.<MED.= 33 NO. EXP.= 30     NO.>=MED.= 27 NO. EXP.= 30   CHI-SQ.=   0.6 DF= 1 SIG.= 0.439
       LEVEL 4 NO.<MED.=  5 NO. EXP.=  7     NO.>=MED.= 10 NO. EXP.=  8   CHI-SQ.=   1.1 DF= 1 SIG.= 0.301
       OVERALL CHI-SQ=   3.3 DF=  7  SIG.= 0.852

 0     ISSUE GROUP =   2   ISSUE =   4   VENT-SBO-ACR

       LEVEL 1 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
       LEVEL 2 NO.<MED.= 27 NO. EXP.= 30     NO.>=MED.= 33 NO. EXP.= 30   CHI-SQ.=   0.6 DF= 1 SIG.= 0.439
       LEVEL 3 NO.<MED.= 27 NO. EXP.= 30     NO.>=MED.= 33 NO. EXP.= 30   CHI-SQ.=   0.6 DF= 1 SIG.= 0.439
       LEVEL 4 NO.<MED.= 13 NO. EXP.=  7     NO.>=MED.=  2 NO. EXP.=  8   CHI-SQ.=   9.6 DF= 1 SIG.= 0.002
       OVERALL CHI-SQ=  10.8 DF=  7  SIG.= 0.146

 0     ISSUE GROUP =   2   ISSUE =   5   SP BYPASS, SMALL/LARGE

       LEVEL 1 NO.<MED.= 61 NO. EXP.= 63     NO.>=MED.= 65 NO. EXP.= 63   CHI-SQ.=   0.1 DF= 1 SIG.= 0.722
       LEVEL 2 NO.<MED.= 13 NO. EXP.= 12     NO.>=MED.= 11 NO. EXP.= 12   CHI-SQ.=   0.2 DF= 1 SIG.= 0.683
       OVERALL CHI-SQ=   0.3 DF=  3  SIG.= 0.961

 0     ISSUE GROUP =   2   ISSUE =   6   CONT FAILURE PRESS. (T<500F B VB)

       LEVEL 1 NO.<MED.=  1 NO. EXP.=  1     NO.>=MED.=  1 NO. EXP.=  1   TEST CANNOT BE RUN; EXP. NO. < 3
       LEVEL 2 NO.<MED.=  7 NO. EXP.=  5     NO.>=MED.=  4 NO. EXP.=  6   CHI-SQ.=   1.5 DF= 1 SIG.= 0.226
       LEVEL 3 NO.<MED.=  5 NO. EXP.= 10     NO.>=MED.= 15 NO. EXP.= 10   CHI-SQ.=   5.0 DF= 1 SIG.= 0.025
       LEVEL 4 NO.<MED.=  6 NO. EXP.=  4     NO.>=MED.=  3 NO. EXP.=  5   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
       LEVEL 5 NO.<MED.= 11 NO. EXP.= 11     NO.>=MED.= 11 NO. EXP.= 11   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
       LEVEL 6 NO.<MED.= 20 NO. EXP.= 19     NO.>=MED.= 18 NO. EXP.= 19   CHI-SQ.=   0.1 DF= 1 SIG.= 0.746
       LEVEL 7 NO.<MED.= 11 NO. EXP.= 10     NO.>=MED.=  9 NO. EXP.= 10   CHI-SQ.=   0.2 DF= 1 SIG.= 0.655
       LEVEL 8 NO.<MED.=  8 NO. EXP.=  8     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
       LEVEL 9 NO.<MED.=  5 NO. EXP.=  6     NO.>=MED.=  7 NO. EXP.=  6   CHI-SQ.=   0.3 DF= 1 SIG.= 0.564
       OVERALL CHI-SQ=   7.1 DF= 15  SIG.= 0.955

 0     ISSUE GROUP =   2   ISSUE =   7   LATE FAILURE LOCATION (800-1200 A VB)

       LEVEL 1 NO.<MED.=  2 NO. EXP.=  2     NO.>=MED.=  3 NO. EXP.=  3   TEST CANNOT BE RUN; EXP. NO. < 3
       LEVEL 2 NO.<MED.= 45 NO. EXP.= 47     NO.>=MED.= 49 NO. EXP.= 47   CHI-SQ.=   0.2 DF= 1 SIG.= 0.680
       LEVEL 3 NO.<MED.= 27 NO. EXP.= 25     NO.>=MED.= 24 NO. EXP.= 26   CHI-SQ.=   0.3 DF= 1 SIG.= 0.575
       OVERALL CHI-SQ=   0.5 DF=  3  SIG.= 0.922

 0     ISSUE GROUP =   2   ISSUE =   8   CONT FAILURE SIZE, RAPID PRESS.
```

```
      LEVEL 1 NO.<MED.=  8 NO. EXP.=  7     NO.>=MED.=  7 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
      LEVEL 2 NO.<MED.= 66 NO. EXP.= 67     NO.>=MED.= 69 NO. EXP.= 68   CHI-SQ.=   0.0 DF= 1 SIG.= 0.863
      OVERALL CHI-SQ=   0.3 DF=  3  SIG.= 0.961

0     ISSUE GROUP =   2   ISSUE =   9   CONT FAILURE SIZE, SLOW PRESS.

      LEVEL 1 NO.<MED.= 37 NO. EXP.= 37     NO.>=MED.= 38 NO. EXP.= 38   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
      LEVEL 2 NO.<MED.= 37 NO. EXP.= 37     NO.>=MED.= 38 NO. EXP.= 38   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
      OVERALL CHI-SQ=   0.0 DF=  3  SIG.= 1.000

0     ISSUE GROUP =   2   ISSUE =  10   VB MODE, HIGH-P FLOW MELT

      LEVEL 1 NO.<MED.= 30 NO. EXP.= 37     NO.>=MED.= 45 NO. EXP.= 38   CHI-SQ.=   2.6 DF= 1 SIG.= 0.106
      LEVEL 2 NO.<MED.= 44 NO. EXP.= 37     NO.>=MED.= 31 NO. EXP.= 38   CHI-SQ.=   2.6 DF= 1 SIG.= 0.106
      OVERALL CHI-SQ=   5.2 DF=  3  SIG.= 0.156

0     ISSUE GROUP =   2   ISSUE =  11   CONT PRESS. BEFORE VB, LONG TERM TB

      LEVEL 1 NO.<MED.= 12 NO. EXP.=  8     NO.>=MED.=  4 NO. EXP.=  8   CHI-SQ.=   4.0 DF= 1 SIG.= 0.046
      LEVEL 2 NO.<MED.= 38 NO. EXP.= 40     NO.>=MED.= 42 NO. EXP.= 40   CHI-SQ.=   0.2 DF= 1 SIG.= 0.655
      LEVEL 3 NO.<MED.= 21 NO. EXP.= 25     NO.>=MED.= 29 NO. EXP.= 25   CHI-SQ.=   1.3 DF= 1 SIG.= 0.258
      LEVEL 4 NO.<MED.=  3 NO. EXP.=  2     NO.>=MED.=  1 NO. EXP.=  2   TEST CANNOT BE RUN; EXP. NO. < 3
      OVERALL CHI-SQ=   5.5 DF=  5  SIG.= 0.360

0     ISSUE GROUP =   2   ISSUE =  12   PRESSURE RISE AT VB

      LEVEL 1 NO.<MED.= 12 NO. EXP.= 15     NO.>=MED.= 18 NO. EXP.= 15   CHI-SQ.=   1.2 DF= 1 SIG.= 0.273
      LEVEL 2 NO.<MED.= 26 NO. EXP.= 22     NO.>=MED.= 19 NO. EXP.= 23   CHI-SQ.=   1.4 DF= 1 SIG.= 0.233
      LEVEL 3 NO.<MED.= 21 NO. EXP.= 19     NO.>=MED.= 17 NO. EXP.= 19   CHI-SQ.=   0.4 DF= 1 SIG.= 0.516
      LEVEL 4 NO.<MED.= 10 NO. EXP.= 11     NO.>=MED.= 12 NO. EXP.= 11   CHI-SQ.=   0.2 DF= 1 SIG.= 0.670
      LEVEL 5 NO.<MED.=  5 NO. EXP.=  7     NO.>=MED.= 10 NO. EXP.=  8   CHI-SQ.=   1.1 DF= 1 SIG.= 0.301
      OVERALL CHI-SQ=   4.3 DF=  9  SIG.= 0.891

0     ISSUE GROUP =   2   ISSUE =  13   DELTA P DUE TO SUMP WATER INTERACT.

      LEVEL 1 NO.<MED.= 25 NO. EXP.= 30     NO.>=MED.= 35 NO. EXP.= 30   CHI-SQ.=   1.7 DF= 1 SIG.= 0.197
      LEVEL 2 NO.<MED.= 43 NO. EXP.= 37     NO.>=MED.= 32 NO. EXP.= 38   CHI-SQ.=   1.9 DF= 1 SIG.= 0.166
      LEVEL 3 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
      OVERALL CHI-SQ=   3.9 DF=  5  SIG.= 0.571

0     ISSUE GROUP =   2   ISSUE =  14   PROB OF DRY DW MELT THROUGH

      LEVEL 1 NO.<MED.= 25 NO. EXP.= 37     NO.>=MED.= 50 NO. EXP.= 38   CHI-SQ.=   7.7 DF= 1 SIG.= 0.006
      LEVEL 2 NO.<MED.= 49 NO. EXP.= 37     NO.>=MED.= 26 NO. EXP.= 38   CHI-SQ.=   7.7 DF= 1 SIG.= 0.006
      OVERALL CHI-SQ=  15.4 DF=  3  SIG.= 0.002

0     ISSUE GROUP =   2   ISSUE =  15   PROB OF WET DW MELT THROUGH

      LEVEL 1 NO.<MED.= 32 NO. EXP.= 30     NO.>=MED.= 28 NO. EXP.= 30   CHI-SQ.=   0.3 DF= 1 SIG.= 0.606
      LEVEL 2 NO.<MED.= 42 NO. EXP.= 45     NO.>=MED.= 48 NO. EXP.= 45   CHI-SQ.=   0.4 DF= 1 SIG.= 0.527
```

```
     OVERALL CHI-SQ=   0.7 DF=  3  SIG.= 0.881

0    ISSUE GROUP =   2   ISSUE =  16   PROB OF DW M-THRU W/HI-P MELT EJECT

     LEVEL 1 NO.<MED.= 37 NO. EXP.= 37     NO.>=MED.= 38 NO. EXP.= 38   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 2 NO.<MED.= 37 NO. EXP.= 37     NO.>=MED.= 38 NO. EXP.= 38   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   0.0 DF=  3  SIG.= 1.000

0    ISSUE GROUP =   2   ISSUE =  17   PROB OF H2 BURNS IN RB LEADING TO BP

     LEVEL 1 NO.<MED.=  9 NO. EXP.= 15     NO.>=MED.= 21 NO. EXP.= 15   CHI-SQ.=   4.8 DF= 1 SIG.= 0.028
     LEVEL 2 NO.<MED.= 65 NO. EXP.= 60     NO.>=MED.= 55 NO. EXP.= 60   CHI-SQ.=   0.8 DF= 1 SIG.= 0.361
     OVERALL CHI-SQ=   5.6 DF=  3  SIG.= 0.131

0    ISSUE GROUP =   3   ISSUE =   1   IN-VES RELEASE FROM FUEL

     LEVEL 1 NO.<MED.= 15 NO. EXP.= 17     NO.>=MED.= 19 NO. EXP.= 17   CHI-SQ.=   0.5 DF= 1 SIG.= 0.493
     LEVEL 2 NO.<MED.= 40 NO. EXP.= 37     NO.>=MED.= 34 NO. EXP.= 37   CHI-SQ.=   0.5 DF= 1 SIG.= 0.486
     LEVEL 3 NO.<MED.= 18 NO. EXP.= 19     NO.>=MED.= 21 NO. EXP.= 20   CHI-SQ.=   0.1 DF= 1 SIG.= 0.749
     LEVEL 4 NO.<MED.=  1 NO. EXP.=  1     NO.>=MED.=  2 NO. EXP.=  2   TEST CANNOT BE RUN; EXP. NO. < 3
     OVERALL CHI-SQ=   1.1 DF=  5  SIG.= 0.958

0    ISSUE GROUP =   3   ISSUE =   2   CSI DECOMP

     LEVEL 1 NO.<MED.= 16 NO. EXP.= 14     NO.>=MED.= 13 NO. EXP.= 15   CHI-SQ.=   0.6 DF= 1 SIG.= 0.457
     LEVEL 2 NO.<MED.= 28 NO. EXP.= 27     NO.>=MED.= 27 NO. EXP.= 28   CHI-SQ.=   0.1 DF= 1 SIG.= 0.787
     LEVEL 3 NO.<MED.= 22 NO. EXP.= 25     NO.>=MED.= 29 NO. EXP.= 26   CHI-SQ.=   0.7 DF= 1 SIG.= 0.401
     LEVEL 4 NO.<MED.=  8 NO. EXP.=  7     NO.>=MED.=  7 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
     OVERALL CHI-SQ=   1.6 DF=  7  SIG.= 0.979

0    ISSUE GROUP =   3   ISSUE =   3   FRAC IN-VES RETENTION LEAKED, AT VB

     LEVEL 1 NO.<MED.=  9 NO. EXP.=  7     NO.>=MED.=  5 NO. EXP.=  7   CHI-SQ.=   1.1 DF= 1 SIG.= 0.285
     LEVEL 2 NO.<MED.= 26 NO. EXP.= 29     NO.>=MED.= 32 NO. EXP.= 29   CHI-SQ.=   0.6 DF= 1 SIG.= 0.431
     LEVEL 3 NO.<MED.= 16 NO. EXP.= 18     NO.>=MED.= 20 NO. EXP.= 18   CHI-SQ.=   0.4 DF= 1 SIG.= 0.505
     LEVEL 4 NO.<MED.= 19 NO. EXP.= 17     NO.>=MED.= 16 NO. EXP.= 18   CHI-SQ.=   0.5 DF= 1 SIG.= 0.499
     LEVEL 5 NO.<MED.=  4 NO. EXP.=  3     NO.>=MED.=  3 NO. EXP.=  4   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   2.7 DF=  9  SIG.= 0.976

0    ISSUE GROUP =   3   ISSUE =   4   S POOL DF

     LEVEL 1 NO.<MED.=  5 NO. EXP.=  7     NO.>=MED.= 10 NO. EXP.=  8   CHI-SQ.=   1.1 DF= 1 SIG.= 0.301
     LEVEL 2 NO.<MED.= 40 NO. EXP.= 38     NO.>=MED.= 36 NO. EXP.= 38   CHI-SQ.=   0.2 DF= 1 SIG.= 0.646
     LEVEL 3 NO.<MED.= 15 NO. EXP.= 15     NO.>=MED.= 15 NO. EXP.= 15   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 4 NO.<MED.= 11 NO. EXP.= 12     NO.>=MED.= 13 NO. EXP.= 12   CHI-SQ.=   0.2 DF= 1 SIG.= 0.683
     LEVEL 5 NO.<MED.=  3 NO. EXP.=  2     NO.>=MED.=  2 NO. EXP.=  3   TEST CANNOT BE RUN; EXP. NO. < 3
     OVERALL CHI-SQ=   1.4 DF=  7  SIG.= 0.984

0    ISSUE GROUP =   3   ISSUE =   5   S POOL DF, VOL I
```

```
     LEVEL 1 NO.<MED.=  3 NO. EXP.=  2     NO.>=MED.=  1 NO. EXP.=  2   TEST CANNOT BE RUN; EXP. NO. < 3
     LEVEL 2 NO.<MED.= 20 NO. EXP.= 17     NO.>=MED.= 15 NO. EXP.= 18   CHI-SQ.=   1.0 DF= 1 SIG.= 0.310
     LEVEL 3 NO.<MED.= 25 NO. EXP.= 23     NO.>=MED.= 21 NO. EXP.= 23   CHI-SQ.=   0.3 DF= 1 SIG.= 0.555
     LEVEL 4 NO.<MED.= 23 NO. EXP.= 25     NO.>=MED.= 27 NO. EXP.= 25   CHI-SQ.=   0.3 DF= 1 SIG.= 0.572
     LEVEL 5 NO.<MED.=  3 NO. EXP.=  7     NO.>=MED.= 12 NO. EXP.=  8   CHI-SQ.=   4.3 DF= 1 SIG.= 0.038
     OVERALL CHI-SQ=   6.0 DF=  7  SIG.= 0.542

0    ISSUE GROUP =   3   ISSUE =   6   REVOL FROM RPV (FRVOL)

     LEVEL 1 NO.<MED.=  3 NO. EXP.=  2     NO.>=MED.=  1 NO. EXP.=  2   TEST CANNOT BE RUN; EXP. NO. < 3
     LEVEL 2 NO.<MED.= 27 NO. EXP.= 23     NO.>=MED.= 20 NO. EXP.= 24   CHI-SQ.=   1.4 DF= 1 SIG.= 0.243
     LEVEL 3 NO.<MED.= 38 NO. EXP.= 38     NO.>=MED.= 38 NO. EXP.= 38   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 4 NO.<MED.=  6 NO. EXP.= 11     NO.>=MED.= 17 NO. EXP.= 12   CHI-SQ.=   4.4 DF= 1 SIG.= 0.037
     OVERALL CHI-SQ=   5.7 DF=  5  SIG.= 0.335

0    ISSUE GROUP =   3   ISSUE =   7   CCI REL

     LEVEL 1 NO.<MED.= 12 NO. EXP.=  9     NO.>=MED.=  6 NO. EXP.=  9   CHI-SQ.=   2.0 DF= 1 SIG.= 0.157
     LEVEL 2 NO.<MED.= 36 NO. EXP.= 31     NO.>=MED.= 26 NO. EXP.= 31   CHI-SQ.=   1.6 DF= 1 SIG.= 0.204
     LEVEL 3 NO.<MED.= 22 NO. EXP.= 27     NO.>=MED.= 33 NO. EXP.= 28   CHI-SQ.=   1.8 DF= 1 SIG.= 0.177
     LEVEL 4 NO.<MED.=  4 NO. EXP.=  7     NO.>=MED.= 11 NO. EXP.=  8   CHI-SQ.=   2.4 DF= 1 SIG.= 0.120
     OVERALL CHI-SQ=   7.8 DF=  7  SIG.= 0.347

0    ISSUE GROUP =   3   ISSUE =   8   RB DF

     LEVEL 1 NO.<MED.= 17 NO. EXP.= 12     NO.>=MED.=  8 NO. EXP.= 13   CHI-SQ.=   4.0 DF= 1 SIG.= 0.045
     LEVEL 2 NO.<MED.= 35 NO. EXP.= 29     NO.>=MED.= 23 NO. EXP.= 29   CHI-SQ.=   2.5 DF= 1 SIG.= 0.115
     LEVEL 3 NO.<MED.= 18 NO. EXP.= 26     NO.>=MED.= 34 NO. EXP.= 26   CHI-SQ.=   4.9 DF= 1 SIG.= 0.027
     LEVEL 4 NO.<MED.=  4 NO. EXP.=  7     NO.>=MED.= 11 NO. EXP.=  8   CHI-SQ.=   2.4 DF= 1 SIG.= 0.120
     OVERALL CHI-SQ=  13.8 DF=  7  SIG.= 0.054

0    ISSUE GROUP =   3   ISSUE =   9   REF BAY DF

     LEVEL 1 NO.<MED.=  6 NO. EXP.=  6     NO.>=MED.=  6 NO. EXP.=  6   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 2 NO.<MED.= 16 NO. EXP.= 13     NO.>=MED.= 11 NO. EXP.= 14   CHI-SQ.=   1.3 DF= 1 SIG.= 0.248
     LEVEL 3 NO.<MED.= 24 NO. EXP.= 28     NO.>=MED.= 33 NO. EXP.= 29   CHI-SQ.=   1.1 DF= 1 SIG.= 0.289
     LEVEL 4 NO.<MED.= 28 NO. EXP.= 27     NO.>=MED.= 26 NO. EXP.= 27   CHI-SQ.=   0.1 DF= 1 SIG.= 0.785
     OVERALL CHI-SQ=   2.5 DF=  7  SIG.= 0.925

0    ISSUE GROUP =   3   ISSUE =  10   LATE RELEASE FRACT, IODINE

     LEVEL 1 NO.<MED.=  3 NO. EXP.=  3     NO.>=MED.=  4 NO. EXP.=  4   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 2 NO.<MED.= 22 NO. EXP.= 24     NO.>=MED.= 27 NO. EXP.= 25   CHI-SQ.=   0.3 DF= 1 SIG.= 0.568
     LEVEL 3 NO.<MED.= 40 NO. EXP.= 36     NO.>=MED.= 33 NO. EXP.= 37   CHI-SQ.=   0.9 DF= 1 SIG.= 0.349
     LEVEL 4 NO.<MED.=  9 NO. EXP.= 10     NO.>=MED.= 12 NO. EXP.= 11   CHI-SQ.=   0.2 DF= 1 SIG.= 0.662
     OVERALL CHI-SQ=   1.4 DF=  7  SIG.= 0.986
```

168

```
CONSEQUENCE MEASURE:
  IND.RISK OF FATALITY


BASE CASE :
 PEACH BOTTOM LLH (MACCS)

ISSUE LEVELS FOR EACH SAMPLE MEMBER, IN ORDER OF INCREASING RISK
         RISK  ISSUE LEVELS, FOR ALL ISSUES
           1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
8.261E-12  3  2  3  2  3  2  4  3  1  1  8  3  1  2  2  3  4  2  2  2  1  2  2  2  4  2  2  2  2  2  1  2
1.227E-11  2  2  2  1  1  2  3  3  4  1  6  3  2  2  2  1  2  1  2  2  2  2  2  2  2  2  4  3  3  2  2  2
3.203E-11  2  2  2  2  2  2  3  3  3  1  8  2  2  1  1  2  2  1  2  2  1  2  1  2  1  2  3  2  1  1  4  3
3.614E-11  3  2  2  1  3  3  3  2  3  1  5  3  2  2  2  1  2  3  2  2  2  2  2  1  4  2  4  3  2  2  4  1
5.950E-11  2  2  3  1  1  3  2  3  2  1  6  2  2  2  1  3  5  2  1  1  1  2  2  3  5  4  3  3  1  2  4  2
6.243E-11  2  1  2  2  1  4  1  3  3  1  3  3  1  2  2  2  2  2  2  1  2  2  1  2  2  3  4  3  2  1  4  3
6.958E-11  3  3  2  2  3  3  3  1  1  1  9  3  2  1  1  1  3  2  2  1  2  2  1  3  2  3  4  2  2  1  2  1
7.823E-11  3  3  3  1  1  1  2  2  3  1  4  3  2  1  2  2  2  2  2  1  2  2  3  1  2  2  2  3  1  2  4  3
8.124E-11  3  3  2  1  1  2  3  3  2  1  6  2  2  1  2  2  2  2  2  2  2  2  2  4  3  2  4  4  1  1  1  2
8.301E-11  3  1  3  2  4  2  1  3  3  1  7  3  2  2  2  1  3  1  2  1  1  2  2  2  2  2  3  4  2  2  3  2
8.917E-11  2  2  2  1  2  2  2  3  3  1  9  2  2  2  1  2  4  2  2  2  2  2  1  2  4  5  4  2  2  2  4  3
9.647E-11  2  3  1  1  3  3  3  4  3  2  5  2  2  1  2  3  3  2  1  2  2  2  3  2  4  2  3  3  2  1  3  2
1.092E-10  2  2  2  2  2  2  2  2  3  1  6  2  2  1  1  1  1  1  2  2  1  2  2  1  2  4  2  3  3  2  1  3
1.109E-10  3  2  3  2  1  2  3  2  2  1  7  2  2  2  1  3  1  2  2  1  1  1  3  3  2  2  1  2  2  2  4  3
1.251E-10  3  3  1  1  1  2  3  4  3  1  6  2  2  2  2  2  1  2  2  2  2  2  2  3  4  2  3  2  3  2  2  3
1.312E-10  2  2  2  1  4  2  2  3  2  1  7  3  2  1  2  1  1  2  2  2  1  2  2  3  4  2  3  3  3  2  4  4
1.524E-10  2  1  3  2  2  4  3  2  2  1  7  2  2  1  2  1  3  1  1  1  2  1  3  1  2  4  1  2  2  2  4  3
1.541E-10  2  3  3  1  1  3  2  3  3  2  7  2  2  2  1  2  2  2  2  2  1  2  2  3  4  1  3  3  2  3  4  3
1.556E-10  1  3  3  1  2  3  2  1  3  1  6  2  2  2  2  3  5  3  2  1  1  2  2  4  4  3  4  3  3  1  1  3
1.673E-10  1  3  3  2  1  3  2  2  3  2  3  2  2  1  2  3  3  1  1  1  2  2  2  4  4  2  2  3  3  1  3  2
1.965E-10  1  3  2  1  3  3  4  2  3  1  3  3  2  1  2  2  2  3  2  2  2  2  2  1  2  2  3  2  1  3  3  2
2.108E-10  2  3  3  2  2  2  2  2  2  1  2  3  2  1  2  3  2  2  2  2  2  2  2  2  5  2  2  3  4  2  2  3
2.114E-10  2  3  2  1  2  4  3  2  3  2  6  2  2  1  1  2  1  1  2  1  2  2  1  3  4  1  4  4  2  2  3  2
2.251E-10  3  3  2  1  2  2  2  3  2  1  6  2  2  1  2  2  1  1  2  1  2  2  1  2  2  2  3  3  2  3  3  2
2.492E-10  3  2  1  1  3  1  1  3  4  1  9  2  2  2  2  2  4  2  2  2  1  2  2  2  2  4  2  3  2  3  3  2
2.648E-10  4  3  3  1  3  2  3  1  3  2  6  3  2  2  2  3  3  1  2  2  2  2  1  1  3  2  2  2  3  2  2  2
2.722E-10  2  2  3  2  2  3  4  2  2  1  9  3  2  2  1  3  3  2  1  1  1  2  1  1  4  3  4  2  2  4  1  2
2.815E-10  2  1  3  2  2  1  2  3  4  1  5  2  2  2  1  2  2  3  1  2  2  2  2  3  1  2  3  3  4  2  4  2
2.851E-10  3  3  1  1  2  3  4  3  3  1  3  3  2  2  1  2  2  1  1  2  1  2  2  2  2  2  2  3  3  1  4  3
2.948E-10  2  3  3  1  3  2  2  3  4  2  8  2  2  1  2  3  2  1  2  1  1  2  2  2  2  4  4  2  2  2  4  2
3.061E-10  2  2  4  1  4  2  3  3  3  1  6  2  2  2  1  3  2  2  2  2  1  2  1  1  2  2  2  3  2  1  4  3
3.191E-10  1  1  3  1  2  3  4  2  2  1  3  3  2  1  2  2  2  1  1  2  1  2  2  1  2  2  2  2  3  3  3  3
3.236E-10  3  2  3  1  1  3  3  4  2  1  5  3  2  1  1  2  3  2  1  2  1  2  3  3  1  2  3  3  1  3  4  3
3.292E-10  2  2  3  2  2  3  3  4  4  1  6  2  2  2  1  1  2  2  2  2  2  2  2  3  2  2  3  3  3  1  3  4
3.349E-10  2  2  2  1  2  4  3  3  2  1  8  2  2  2  2  3  2  1  2  2  1  2  3  1  3  2  4  4  3  1  3  4
3.440E-10  1  1  3  2  2  3  4  2  2  1  2  2  2  2  2  1  3  2  1  2  1  1  2  2  3  3  3  2  2  3  2  3
3.522E-10  2  3  2  2  3  2  2  2  2  1  4  1  2  2  2  1  3  2  2  1  1  2  2  1  4  2  2  3  2  2  3  4
3.576E-10  2  2  2  1  3  4  3  2  2  1  6  3  2  2  2  3  5  2  1  1  2  2  1  4  2  2  2  3  2  2  4  3
3.603E-10  2  2  2  1  2  3  1  3  3  1  3  2  2  2  1  3  2  2  2  2  1  2  1  3  3  2  2  2  3  4  3  3
3.619E-10  2  2  3  2  3  4  2  3  3  1  6  2  2  1  2  4  1  2  2  2  1  1  2  4  2  2  3  2  1  2  3  2
3.623E-10  3  2  2  1  3  2  3  3  4  1  7  2  1  1  1  2  3  2  2  2  2  2  3  3  4  4  2  3  3  3  3  1
3.675E-10  2  1  4  1  3  2  3  1  3  1  6  2  2  2  2  2  2  3  1  2  2  2  2  3  2  2  3  3  1  3  2  3
3.740E-10  3  2  1  1  2  2  3  2  1  1  1  3  2  1  1  1  2  1  1  2  1  2  2  4  3  4  4  3  2  1  3  3
4.035E-10  3  2  3  1  2  2  3  3  4  1  6  2  2  2  1  4  4  2  2  1  2  2  3  3  3  2  3  2  3  2  3  4
4.279E-10  1  2  2  2  2  2  3  2  2  1  4  3  2  2  1  3  2  2  1  2  1  2  2  1  3  1  2  3  4  3  4  2
4.416E-10  4  2  3  2  2  3  3  1  2  2  7  2  2  2  1  2  1  2  2  2  1  2  2  3  3  3  2  3  3  1  4  3
4.563E-10  3  1  2  2  1  2  1  2  1  1  8  3  2  1  2  3  4  2  2  2  1  2  3  2  3  1  2  2  4  4  4  3
4.861E-10  2  1  2  2  3  3  2  1  2  2  6  2  2  1  1  2  3  1  2  2  2  2  2  2  3  1  4  2  3  3  3  1
5.105E-10  2  2  2  2  2  1  3  3  2  1  6  3  2  2  2  2  2  2  1  2  2  2  2  2  4  2  4  2  2  2  3  3
5.392E-10  3  2  1  2  3  2  3  2  3  1  2  3  1  1  2  3  3  1  2  2  2  2  2  3  1  2  2  3  2  3  3  3
5.455E-10  3  1  2  1  2  3  1  4  2  1  2  2  2  1  1  2  3  2  2  1  2  1  2  1  2  2  3  2  2  2  2  4
5.596E-10  1  2  2  1  2  2  3  3  3  1  5  2  2  2  1  2  4  1  2  1  2  1  4  4  1  5  3  3  3  2  1  2
5.603E-10  2  3  3  1  3  3  2  1  1  1  7  2  2  1  1  2  2  2  2  2  2  2  2  2  1  1  3  3  3  2  3  3
5.683E-10  2  3  2  1  2  1  2  3  1  1  5  3  2  2  1  2  1  1  2  2  1  2  2  1  2  5  2  4  1  2  2  2
6.137E-10  4  3  3  1  2  3  3  3  2  1  6  2  2  1  2  2  2  1  2  1  2  2  2  3  3  4  2  3  3  2  2  3
6.362E-10  3  2  3  1  3  3  4  4  3  1  7  2  2  2  1  3  2  1  1  1  1  2  4  3  2  3  2  3  3  3  4  2
6.473E-10  3  2  3  1  3  4  3  2  2  2  8  2  2  1  2  2  2  1  2  1  2  2  1  3  5  3  2  3  1  3  3  4
6.580E-10  1  1  2  1  2  2  4  2  2  2  6  2  2  2  1  2  4  1  1  1  2  2  2  3  4  3  4  6  4  4  3  3
6.604E-10  3  2  2  1  2  4  2  3  3  1  8  3  2  1  2  2  1  1  1  2  2  2  3  1  4  3  4  3  3  2  3  3
6.898E-10  3  2  2  1  3  1  2  2  2  1  9  2  2  2  1  3  1  3  2  1  2  2  2  3  2  3  3  4  2  3  4  3
6.941E-10  4  3  3  2  2  3  3  1  2  1  4  2  1  1  2  2  5  1  2  2  1  2  3  2  2  2  4  2  3  1  4  3
7.372E-10  3  2  2  1  2  3  3  2  3  1  9  2  2  1  1  2  1  2  1  2  2  1  1  4  4  2  3  3  3  2  3  2
7.388E-10  3  3  1  2  2  3  2  2  1  1  6  1  1  1  1  4  3  2  2  2  2  2  2  1  3  1  4  2  1  3  4  2
7.461E-10  3  3  2  1  3  3  1  1  4  1  5  3  2  1  2  2  3  1  2  2  2  2  2  3  1  2  4  3  3  1  2  3
7.706E-10  2  3  3  1  4  2  2  3  3  1  6  2  2  2  1  2  4  2  1  1  1  2  3  3  3  4  3  2  1  2  4  3
7.948E-10  2  1  3  1  3  1  3  3  3  1  3  2  2  2  1  2  4  1  2  2  1  1  1  1  3  2  5  4  2  1  2  3
8.105E-10  3  2  3  1  3  3  2  2  2  1  7  3  2  1  2  3  4  3  1  1  1  2  2  2  2  3  5  3  2  3  2  3
8.174E-10  3  2  3  2  3  2  3  4  2  1  8  2  2  2  1  2  3  1  2  1  1  2  1  3  4  2  5  3  3  2  3  3
8.302E-10  3  3  2  1  2  1  2  3  3  1  2  2  2  2  2  2  3  2  2  1  1  2  1  2  3  3  4  3  2  4  4  3
8.712E-10  3  3  4  2  2  3  2  3  2  1  7  2  1  1  1  2  1  2  2  1  1  2  2  4  3  2  2  1  2  3  2  3
8.985E-10  3  1  2  1  2  3  2  2  2  2  5  2  2  1  2  2  3  2  2  1  2  2  3  2  2  4  3  3  3  3  3  4
9.226E-10  2  3  3  2  2  3  2  2  4  2  9  2  2  1  1  3  2  2  1  1  2  2  2  1  1  2  3  4  2  2  3  3
9.246E-10  3  2  1  2  3  3  3  3  3  2  5  2  2  1  1  2  5  2  2  2  1  2  2  2  2  2  3  2  2  2  2  3
9.257E-10  2  3  2  1  2  2  3  2  4  1  7  2  2  1  2  3  3  1  1  2  1  2  1  2  3  1  1  3  2  2  2  3
9.557E-10  2  3  2  1  2  2  1  3  1  1  4  2  2  1  2  2  3  2  1  2  2  2  1  2  1  2  2  2  2  2  4  3
9.626E-10  2  3  1  2  3  3  2  3  2  1  4  2  2  2  1  2  2  2  2  1  1  2  3  3  2  3  3  3  4  1  3  2
```

169

```
9.679E-10  3  2  3  1  3  2  2  2  2  1  3  2  2  2  2  3  3  2  2  2  1  2  2  3  4  2  1  4  3  3  3  3
9.801E-10  1  3  2  1  2  2  2  3  2  1  8  2  2  1  1  2  2  1  2  2  1  2  3  2  3  2  3  3  2  3  1  2
9.805E-10  4  2  1  2  2  3  2  1  4  1  4  3  2  1  1  2  1  2  1  1  1  1  3  2  4  3  4  4  2  4  4  3
1.015E-09  3  4  2  2  4  3  2  3  2  1  5  2  2  2  2  2  4  2  2  1  2  2  3  3  2  2  3  2  3  2  4  2
1.017E-09  2  2  2  2  2  3  3  2  2  1  9  2  2  2  1  2  3  2  1  2  2  2  2  3  1  3  5  3  3  3  4  4
1.018E-09  2  3  4  2  2  3  1  2  3  1  6  3  2  2  2  2  2  1  1  2  1  2  2  4  2  2  3  2  4  2  4  2
1.070E-09  3  3  3  2  2  3  3  3  2  1  6  2  1  2  1  2  4  3  2  1  1  1  2  3  3  4  3  4  2  1  4  2
1.091E-09  2  2  2  2  3  1  1  3  1  1  2  2  2  1  1  3  3  1  1  2  2  2  1  2  3  2  2  3  2  4  4  2
1.094E-09  2  2  3  2  3  1  2  2  3  1  8  2  2  1  1  2  4  1  1  1  2  1  2  1  2  2  4  4  3  1  3  3
1.101E-09  4  2  4  2  1  3  3  2  3  1  6  3  2  1  2  3  1  2  2  2  1  2  1  3  1  4  4  4  3  4  3  2
1.108E-09  2  4  3  1  4  2  2  2  3  2  7  3  2  2  1  2  1  2  2  1  2  2  3  2  1  3  2  2  4  1  2  3
1.135E-09  3  2  3  2  2  2  3  2  1  1  5  3  2  2  1  2  2  2  2  2  1  1  2  2  4  4  4  3  2  1  4  3
1.157E-09  4  2  2  1  3  2  3  2  3  1  3  2  2  1  1  3  2  1  2  2  2  1  2  3  4  1  4  2  3  1  4  3
1.176E-09  2  2  1  1  3  2  2  4  1  1  6  2  2  2  2  3  3  1  1  1  2  2  2  3  2  2  2  3  4  3  3  3
1.192E-09  3  3  4  2  2  1  2  3  3  1  4  2  2  2  2  3  5  2  1  2  2  2  2  3  2  2  4  3  2  2  4  4
1.203E-09  1  2  3  1  3  2  3  2  2  1  6  2  2  1  1  2  1  2  1  1  2  2  4  3  2  1  4  4  3  4  1  2
1.243E-09  3  1  4  1  3  3  2  4  3  1  8  3  2  1  1  3  5  1  1  2  2  1  2  1  2  3  3  4  3  2  1  1
1.352E-09  3  2  2  1  3  3  3  4  2  1  6  2  2  1  2  3  1  2  1  1  1  2  3  3  3  1  5  3  3  1  3  4
1.381E-09  1  2  2  2  4  4  1  2  2  1  2  2  2  1  2  2  1  1  2  2  2  1  1  2  5  5  4  1  3  2  3  2
1.398E-09  3  2  3  1  2  3  1  2  2  2  2  2  2  2  1  2  2  2  1  2  1  1  3  2  2  1  3  2  3  3  2  2
1.418E-09  3  3  2  2  2  2  3  3  3  2  6  2  1  2  2  3  2  1  1  1  1  2  2  3  1  3  3  2  2  3  3  3
1.424E-09  2  3  2  1  3  2  3  3  1  2  5  2  1  2  2  2  2  2  1  2  2  2  2  1  4  3  3  3  3  2  4  2
1.493E-09  3  2  4  1  3  3  3  2  3  2  2  2  2  2  1  3  3  1  2  2  1  2  3  1  4  3  5  1  2  3  4  3
1.499E-09  3  2  2  1  1  1  3  2  2  1  5  2  2  2  1  3  4  2  1  2  1  2  2  2  3  3  5  2  2  2  4  4
1.510E-09  3  2  3  1  3  2  2  3  1  1  5  2  2  2  2  3  1  2  1  1  2  1  1  2  2  3  5  1  2  1  1  4
1.548E-09  3  2  3  2  3  2  2  3  3  1  3  2  2  1  2  2  1  3  1  1  2  2  1  3  3  3  4  4  4  3  4  2
1.657E-09  1  3  3  2  3  2  3  3  4  1  7  3  2  2  2  2  2  2  1  1  2  2  3  2  3  2  4  2  2  2  2  2
1.683E-09  2  3  3  1  3  2  3  2  3  1  7  2  1  1  2  3  2  1  1  1  1  2  2  3  3  2  4  3  2  2  4  4
1.684E-09  3  3  4  1  3  2  1  4  3  2  7  2  1  1  1  1  2  1  1  2  2  1  3  4  3  4  3  3  1  3  4  3
1.825E-09  4  2  1  1  2  4  1  1  4  1  8  3  2  2  2  1  3  2  1  1  1  2  2  2  4  2  4  3  1  3  2  3
1.871E-09  4  2  2  2  3  2  4  2  3  1  3  2  2  2  1  2  1  2  1  2  2  2  2  3  4  2  2  4  2  4  3  4
1.926E-09  2  2  3  1  3  3  2  1  3  1  5  2  2  2  2  2  3  1  1  2  2  2  1  3  1  2  5  3  1  2  3  1
2.015E-09  3  3  2  2  2  2  2  3  2  1  3  3  2  2  2  2  3  1  1  1  1  1  2  4  3  2  2  3  2  4  2  3
2.096E-09  3  4  4  1  3  2  2  4  2  2  8  2  2  2  2  2  4  2  2  2  2  1  1  3  3  2  3  3  4  2  3  3
2.147E-09  2  3  2  1  2  3  2  1  3  1  5  2  1  1  1  3  5  2  1  2  1  2  1  2  2  5  2  3  3  2  2  3
2.309E-09  3  3  2  1  4  1  2  2  2  1  9  2  2  1  2  2  4  1  1  2  1  2  2  2  2  2  3  3  1  3  4  2
2.395E-09  4  2  1  2  3  4  4  2  2  1  6  2  2  2  2  2  4  1  1  2  2  1  3  3  2  2  3  2  3  2  3  3
2.399E-09  2  3  2  2  3  3  3  2  2  1  7  3  2  1  1  4  3  2  1  2  1  2  2  2  3  3  3  3  2  3  2  4
2.434E-09  4  3  3  1  2  3  2  3  2  1  3  2  2  1  1  2  4  1  1  1  2  2  3  4  2  1  4  2  3  2  2  2
2.661E-09  3  3  2  1  3  2  2  2  2  1  7  3  2  1  1  3  1  3  1  2  1  2  3  1  3  4  4  4  2  3  3  1
2.691E-09  4  2  3  1  4  2  3  4  3  2  6  2  1  1  2  2  3  2  1  1  2  2  2  1  2  2  4  2  4  2  1  3
2.760E-09  3  3  2  2  3  4  4  3  3  1  5  3  2  1  1  1  5  2  1  2  1  2  1  3  2  2  3  2  2  4  4  2
2.822E-09  2  3  2  1  2  3  3  3  2  1  8  1  2  1  2  2  4  3  1  1  1  2  1  3  3  2  4  3  4  3  4  3
2.841E-09  3  2  2  2  2  3  2  3  4  1  2  2  2  1  1  3  5  2  2  1  1  1  2  3  3  3  5  4  3  3  4  2
2.883E-09  4  3  3  2  3  3  2  4  3  2  3  3  2  1  2  3  2  2  1  1  1  1  3  2  4  4  2  3  2  3  3  3
2.933E-09  2  4  2  1  3  3  2  3  3  1  6  3  2  1  1  2  4  1  2  2  1  2  2  1  5  2  3  2  3  2  3  3
3.004E-09  1  3  1  1  2  3  2  2  3  1  5  1  2  2  2  2  2  1  1  1  1  1  1  2  2  2  4  4  3  1  3  2
3.025E-09  3  3  3  2  2  2  2  2  1  1  9  3  2  2  2  3  3  1  1  2  2  1  3  2  2  3  4  3  3  3  4  3
3.032E-09  2  3  2  1  2  2  4  2  4  1  5  3  2  1  2  2  5  2  1  1  1  2  1  2  2  2  3  2  3  3  3  2
3.089E-09  2  3  3  1  3  2  4  3  2  1  2  3  2  1  2  1  3  2  2  2  2  2  3  3  2  4  5  3  3  3  4  3
3.105E-09  1  2  2  2  4  3  2  3  3  1  8  2  2  1  1  2  3  3  2  2  1  2  3  3  4  1  4  2  2  2  4  2
3.177E-09  2  3  1  1  3  2  3  3  3  1  7  3  2  2  1  3  2  1  2  2  2  1  2  2  2  2  4  3  2  3  3  2
3.179E-09  2  1  4  1  4  2  3  2  2  1  4  3  2  2  2  2  3  1  2  1  1  2  2  4  3  2  4  4  2  3  4  3
3.208E-09  2  2  2  1  4  2  3  2  1  1  9  2  2  1  2  3  1  1  1  1  1  1  2  4  4  2  3  2  3  3  4  2
3.298E-09  3  3  2  2  2  2  3  2  2  1  8  2  2  1  2  2  2  2  2  2  2  2  3  2  2  2  5  3  3  3  4  3
3.936E-09  2  3  4  1  4  4  3  3  3  1  3  3  2  2  2  3  1  1  1  1  2  2  1  2  4  4  3  2  3  2  4  3
4.170E-09  3  3  3  2  3  1  3  1  2  1  3  3  2  2  1  3  3  2  1  2  2  1  3  1  4  3  5  2  3  3  3  2
4.288E-09  2  3  2  1  3  2  3  2  3  1  7  2  2  2  1  2  1  3  1  2  1  2  3  3  2  4  4  2  3  4  2  2
4.453E-09  3  3  3  1  3  3  2  2  2  1  6  2  2  2  1  1  5  1  1  2  1  2  2  1  2  4  4  3  3  3  2  4
4.732E-09  2  3  3  2  3  3  2  3  2  1  1  2  2  1  1  3  2  2  2  2  2  2  3  2  4  4  4  2  2  3  1  3
5.724E-09  3  2  3  1  4  1  3  3  2  1  6  2  2  1  1  2  4  2  1  1  2  2  3  3  5  4  2  3  2  3  3  3
6.064E-09  2  3  4  2  3  3  3  2  3  2  3  2  2  2  2  2  1  1  1  2  2  2  2  3  5  1  4  3  1  3  3  2
6.120E-09  2  3  4  2  3  2  2  2  3  1  5  2  1  2  2  2  2  1  1  1  1  2  3  1  2  2  3  3  2  2  2  3
7.563E-09  1  4  3  2  1  3  2  3  3  1  9  2  2  1  1  2  2  1  1  2  2  2  2  1  4  3  4  2  2  3  4  3
1.158E-08  2  4  3  1  3  4  2  3  2  1  6  2  2  2  1  3  3  1  2  2  2  2  3  3  2  2  2  3  2  4  3  3
1.420E-08  2  4  3  2  2  3  2  3  2  1  3  3  2  1  2  2  5  1  2  2  2  2  2  2  2  2  3  3  2  3  3  2
1.484E-08  3  4  2  2  3  2  2  3  2  1  3  3  2  2  1  2  5  3  2  1  2  2  3  2  2  2  4  3  2  3  3  4
1.996E-08  4  4  3  2  2  3  2  2  2  1  6  3  2  1  1  2  3  2  1  2  1  2  3  2  4  2  2  3  3  3  3  3
2.262E-08  4  4  3  2  1  2  4  3  2  1  5  1  2  1  1  2  1  2  1  2  1  2  1  2  3  2  2  4  4  2  3  2
2.755E-08  2  4  3  1  3  4  1  2  3  1  6  2  2  2  1  3  2  3  1  2  1  2  1  2  2  2  5  3  3  2  3  4
3.230E-08  2  4  2  1  2  3  4  4  3  1  5  3  2  1  1  3  1  2  1  1  1  1  1  2  3  4  4  2  4  3  3  3
4.777E-08  3  4  4  1  2  3  3  2  2  1  3  2  2  2  2  3  1  2  1  2  2  2  2  2  2  4  4  3  1  2  3  3
4.866E-08  3  4  3  1  2  2  2  2  3  1  6  3  2  2  2  3  5  1  1  2  1  2  2  2  4  2  5  3  2  2  3  4
5.881E-08  3  4  3  1  4  3  3  1  3  2  6  2  2  1  1  2  4  1  2  2  1  1  2  2  2  3  4  3  2  4  4  4

     MEAN =     3.218E-09     VARIANCE =     6.938E-17

     PERCENTILES :
          5-TH =     7.823E-11  50-TH =     9.591E-10  95-TH =     1.484E-08
     LOGARITHMIC MIDPOINT (OF POINTS > 0.) =     6.970E-10
     NUMBER ABOVE MIDPOINT = 89
     NUMBER BELOW MIDPOINT =  61
     CHI-SQUARED(1) =     5.227E+00
     REJECT NULL (p < .05)
```

```
      CONSEQUENCE MEASURE:
       IND.RISK OF FATALITY


       BASE CASE :
        PEACH BOTTOM LLH (MACCS)

       FRACTIONAL CONTRIBUTION OF EACH SEQUENCE TO MEAN RISK
                       SEQUENCE            CONTRIBUTION
                       TB                        0.1390
                       TBUX                      0.7813
                       TBU                       0.0064
                       TCSX                      0.0160
                       TCUX                      0.0042
                       TCSRX2                    0.0374
                       TCSRV23                   0.0158
1      CONSEQUENCE MEASURE:
       IND.RISK OF FATALITY


       BASE CASE :
        PEACH BOTTOM LLH (MACCS)

       FRACTIONAL CONTRIBUTION OF EACH NONZERO BIN TO MEAN RISK
          BIN                   CONTRIBUTION
              AAACAAGEFABCCABBEEABBB        0.0001
              AAACAAGGDABCBABBEEABBB        0.0001
              AAACACDEEABCCACBEDABBB        0.0001
              AAACACGGDABCBABBECABBB        0.0003
              AAACACGGDABCBABBEDABBB        0.0010
              AAACACGGDABCBABBEEABBB        0.0008
              AAACACGGDABCBADBECABBB        0.0001
              AAACACGGDABCBADBEDABBB        0.0006
              AAACACGGDABCBADBEEABBB        0.0009
              BAACAAGBDAACBBBBHHABBB        0.0003
              BAACAAGBDAACBDDBHHABBB        0.0003
              BAACAAGBDABCBBBBHHABBB        0.0005
              BAACAAGBDABCBDDBHHABBB        0.0003
              BAACAAGBFAACCBBBHHABBB        0.0002
              BAACAAGBFAACCDDBHHABBB        0.0001
              BAACAAGBFABCCBBBHHABBB        0.0004
              BAACAAGBFABCCDDBHHABBB        0.0001
              BAACACGBDAACBBBBHHABBB        0.0050
              BAACACGBDAACBDDBHHABBB        0.0020
              BAACACGBDABCBBBBHHABBB        0.0006
              BAACACGBDABCBDDBHHABBB        0.0005
              BAACACGBFAACCBBBHHABBB        0.0016
              BAACACGBFAACCDDBHHABBB        0.0003
              BAACACGBFABCCBBBHHABBB        0.0011
              BAACACGBFABCCDDBHHABBB        0.0002
              BAACACGGDAACBABBDDABBB        0.0004
              BAACACGGDABCBABBDEABBB        0.0001
              BAACCCGBDAACBDDBHHABBB        0.0001
              BAACCCGBFAACCBBBHHABBB        0.0001
              BABBACGCFAACCBBBHHABBB        0.0001
              BABBACGCFAACCBBBHHBBBB        0.0001
              BABBACGGDAACBABBEGABBB        0.0001
              BABBACGGDABCBABBEGABBB        0.0001
              BABBACGGDABCBADBEGABBB        0.0001
              BACBAAGCFABCCBBBHHABBB        0.0002
              BACBAAGCFABCCDDBHHABBB        0.0002
              CAACAABGDDACBABBADABAB        0.0002
              CAACAABGDDACBABBAEABAB        0.0002
              CAACAABGFDACBCCBABBAAB        0.0001
              CAACAABGFDACBCCBACABAB        0.0005
              CAACAABGFDACBCCBADABAB        0.0007
              CAACAABGFDACBCCBAEABAB        0.0002
              CAACACBGDABCBABBADABAB        0.0002
              CAACACBGDABCBABBAEABAB        0.0002
              CAACACBGDDACBABBADABAB        0.0004
              CAACACBGDDACBABBAEABAB        0.0005
              CAACACBGDDACBABBAGABAB        0.0001
              CAACACBGDDACBCCBAABAAB        0.0001
              CAACACBGDDACBCDBABBAAB        0.0001
              CAACACBGDDACBCDBACABAB        0.0001
              CAACACBGDDACBCDBADABAB        0.0002
              CAACACBGDDACBCDBAEABAB        0.0005
              CAACACBGDDACBCDBAFABAB        0.0002
              CAACACBGFDACBCCBACABAB        0.0006
              CAACACBGFDACBCCBADABAB        0.0008
              CAACACBGFDACBCCBAEABAB        0.0002
              CAACACBGFDACBCDBACABAB        0.0005
              CAACACBGFDACBCDBADABAB        0.0010
              CAACACBGFDACBCDBAEABAB        0.0005
              CAACCCBGDDACBABBADABAB        0.0001
              CAACCCBGDDACBABBAEABAB        0.0002
```

CAACCCBGDDACBCDBADABAB	0.0001
CAACCCBGDDACBCDBAEABAB	0.0001
CAACCCBGFDACBCCBACABAB	0.0002
CAACCCBGFDACBCCBADABAB	0.0002
CAACCCBGFDACBCCBAEABAB	0.0001
CAACCCBGFDACBCDBADABAB	0.0001
CAACCCBGFDACBCDBAEABAB	0.0001
DAAAAAGBDABCBBBBHHABBB	0.0011
DAAAAAGBDABCBDDBHHABBB	0.0001
DAAAAAGBDDACBBBBHHABBB	0.0019
DAAAAAGBDDACBBBBHHBABB	0.0001
DAAAAAGBDDACBDDBHHABBB	0.0004
DAAAAAGBFABCCBBBHHABBB	0.0008
DAAAAAGBFABCCDDBHHABBB	0.0001
DAAAAAGBFDACCBBBHHABBB	0.0024
DAAAAAGBFDACCDDBHHABBB	0.0007
DAAAAAGGDDACBBBBADABAB	0.0001
DAAAAAGGDDACBBBBAEABAB	0.0001
DAAAAAGGDDACBDDBADABAB	0.0001
DAAAAAGGDDACBDDBAEABAB	0.0001
DAAAACGBDABCBBBBHHABBB	0.0014
DAAAACGBDABCBDDBHHABBB	0.0003
DAAAACGBDDACBBBBHHABBB	0.0052
DAAAACGBDDACBBBBHHBABB	0.0002
DAAAACGBDDACBDDBHHABBB	0.0020
DAAAACGBDDACBDDBHHBABB	0.0001
DAAAACGBFABCCBBBHHABBB	0.0010
DAAAACGBFABCCDDBHHABBB	0.0002
DAAAACGBFDACCBBBHHABBB	0.0041
DAAAACGBFDACCBBBHHBABB	0.0001
DAAAACGBFDACCDDBHHABBB	0.0005
DAAAACGGDDACBBBBACABAB	0.0001
DAAAACGGDDACBBBBADABAB	0.0005
DAAAACGGDDACBBBBAEABAB	0.0017
DAAAACGGDDACBDDBADABAB	0.0001
DAAAACGGDDACBDDBAEABAB	0.0005
DAAAACGGDDACBDDBAGABAB	0.0001
DAAACCGBDDACBBBBHHABBB	0.0006
DAAACCGBDDACBDDBHHABBB	0.0002
DAAACCGBFDACCBBBHHABBB	0.0002
DAAACCGBFDACCDDBHHABBB	0.0001
DAAACCGGDDACBDDBAEABAB	0.0001
DABAAAGADABCBBBBHGABAB	0.0002
DABAAAGADABCBDDBHGABAB	0.0013
DABAAAGADDACBBBBHGABAB	0.0007
DABAAAGADDACBDDBHGABAB	0.0007
DABAACGADABCBBBBHGABAB	0.0017
DABAACGADABCBDDBHGABAB	0.0010
DABAACGADDACBBBBHGABAB	0.0067
DABAACGADDACBDDBHGABAB	0.0025
DACAAAGADABCCBBBHHABBB	0.0007
DACAAAGADABCCDDBHHAPBB	0.0001
DACAAAGADDACCBBBHHABBB	0.0001
EBAACCFGFDBCBADBEHBBBB	0.0002
EBAACCGGDDBCBABBEGABBB	0.0003
EBAACCGGDDBCBABBEGBBBB	0.0004
EBAACCGGDDBCBABBEHABBB	0.0021
EBAACCGGDDBCBABBEHBBBB	0.0016
EBAACCGGDDBCBADBEHABBB	0.0007
EBAACCGGDDBCBADBEHBBBB	0.0009
EBACBBGEFCBCCABBFEABBA	0.0006
EBACBBGGDCBCBABBFBBABA	0.0135
EBACBBGGDCBCBABBFCBABA	0.0011
EBACBBGGDCBCBABBFDABBA	0.0010
EBACBBGGDCBCBABBFEABBA	0.0004
EBACBBGGDCBCBABBFFABBA	0.0003
EBACBCGGDCBCBABBFBBABA	0.0160
EBACBCGGDCBCBABBFCBABA	0.0010
EBACBCGGDCBCBABBFDABBA	0.0004
EBACBCGGDCBCBABBFEABBA	0.0009
EBACBCGGDCBCBABBFFABBA	0.0003
EBACBCGGDCBCBABBFFBBBA	0.0024
EBACBCGGDCBCBADBFBBABA	0.0022
EBACBCGGDCBCBADBFEABBA	0.0016
EBACBCGGDCBCBADBFFABBA	0.0002
EBACCCDEEDBCCADBFBBABB	0.0003
EBACCCDGFDBCBABBFBBABB	0.0002
EBACCCDGFDBCBADBFBBABB	0.0075
EBACCCDGFDBCBADBFCBABB	0.0001
EBACCCDGFDBCBADBFEBBBB	0.0002
EBACCCFGFDBBBADBFCBABB	0.0038
EBACCCFGFDBBBADBFEABBB	0.0006
EBACCCFGFDBCBABBFBBABB	0.0001
EBACCCFGFDBCBABBFCBABB	0.0020
EBACCCFGFDBCBABBFEABBB	0.0073
EBACCCFGFDBCBACBFCBABB	0.0044

EBACCCFGFDBCBACBFEABBB	0.0005
EBACCCFGFDBCBADBFBBABB	0.0018
EBACCCFGFDBCBADBFCABBB	0.0002
EBACCCFGFDBCBADBFCBABB	0.0614
EBACCCFGFDBCBADBFEABBB	0.0053
EBACCCFGFDBCBADBFEBBBB	0.0010
EBACCCFGFDBCBADBFFABBB	0.0002
EBACCCGDFDBCBABBFABAAB	0.0001
EBACCCGDFDBCBABBFBFABB	0.0001
EBACCCGEFDBCCABBFCBABB	0.0001
EBACCCGEFDBCCABBFEABBB	0.0003
EBACCCGEFDBCCADBFCBABB	0.0306
EBACCCGEFDBCCADBFEBBBB	0.0041
EBACCCGFFDBCBABBFEABBB	0.0001
EBACCCGGDDBBBABBFABABB	0.0007
EBACCCGGDDBBBABBFBBABB	0.0001
EBACCCGGDDBBBABBFEABBB	0.0008
EBACCCGGDDBBBABBFFABBB	0.0006
EBACCCGGDDBBBABBFGABBB	0.0006
EBACCCGGDDBBBADBFABABB	0.0007
EBACCCGGDDBBBADBFCBABB	0.0006
EBACCCGGDDBBBADBFEABBB	0.0001
EBACCCGGDDBBBADBFFBBBB	0.0001
EBACCCGGDDBCBABBFABABB	0.0453
EBACCCGGDDBCBABBFBABAB	0.0002
EBACCCGGDDBCBABBFBBABB	0.1244
EBACCCGGDDBCBABBFCBABB	0.0182
EBACCCGGDDBCBABBFCBBBB	0.0015
EBACCCGGDDBCBABBFDABBB	0.0106
EBACCCGGDDBCBABBFDBBBB	0.0006
EBACCCGGDDBCBABBFEABBB	0.10[illegible]
EBACCCGGDDBCBABBFEBBBB	0.0111
EBACCCGGDDBCBABBFFABBB	0.1122
EBACCCGGDDBCBABEFFBBBB	0.0039
EBACCCGGDDBCBABBFGABBB	0.0135
EBACCCGGDDBCBADBFABABB	0.0217
EBACCCGGDDBCBADBFBBABB	0.0510
EBACCCGGDDBCBADBFCBABB	0.0022
EBACCCGGDDBCBADBFEABBB	0.0093
EBACCCGGDDBCBADBFEBBBB	0.0006
EBACCCGGDDBCBADBFFABBB	0.0045
EBACCCGGDDBCBADBFFBBBB	0.0063
EBACCCGGDDBCBADBFGABBB	0.0001
EBACCCGGEDBBBABBFBBABB	0.0001
EBACCCGGEDBBBADBFEABBB	0.0009
EBACCCGGEDBCBABBFBBABB	0.0003
EBACCCGGEDBCBABBFCBABB	0.0074
EBACCCGGEDBCBABBFCBBBB	0.0011
EBACCCGGEDBCBABBFEABBB	0.0276
EBACCCGGEDBCBABBFEBBBB	0.0033
EBACCCGGEDBCBABBFFABBB	0.0001
EBACCCGGEDBCBABBFGABBB	0.0001
EBACCCGGEDBCBADBFCBABB	0.0102
EBACCCGGEDBCBADBFDBBBB	0.0002
EBACCCGGEDBCBADBFEABBB	0.0015
EBACCCGGEDBCBADBFEBBBB	0.0030
EBACCCGGEDBCBADBFFBBBB	0.0001
EBBBACGEFBBCCABBDGABBB	0.0001
EBBBACGEFBBCCABBEGABBB	0.0001
EBBBACGGDBBCBABBDGABBB	0.0002
EBBBACGGDBBCBABBEGABBB	0.0002
EBBBACGGDBBCBADBDGABBB	0.0004
EBBBACGGDBBCBADBEGABBB	0.0004
EBCBAAGCFBBACDDBHHABBB	0.0002
FCACBBDEECBCCACBEBBABA	0.0001
FCACBBGGDCBCBABBDBBABA	0.0001
FCACBBGGDCBCBABBDCBABA	0.0001
FCACBBGGDCBCBABBDEABBA	0.0004
FCACBBGGDCBCBABBEBBABA	0.0005
FCACBBGGDCBCBABBECBABA	0.0001
FCACBBGGDCBCBABBEEABBA	0.0001
FCACBCDEECBCCACBEBBABA	0.0001
FCACBCGGDCBCBABBDBBABA	0.0002
FCACBCGGDCBCBABBDEABBA	0.0002
FCACBCGGDCBCBABBEBBABA	0.0002
FCACBCGGDCBCBABBECBABA	0.0001
FCACBCGGDCBCBABBEEABBA	0.0001
FCACBCGGDCBCBABBEFABBA	0.0001
FCACBCGGDCBCBADBDCBABA	0.0001
FCACBCGGDCBCBADBEBBABA	0.0001
FCACBCGGDCBCBADBECBABA	0.0001
FCACBCGGDCBCBADBEFABBA	0.0002
FCACBCGGDCBCBADBGEABBA	0.0001
FCACCCDGFDBBBADBDCBABB	0.0001
FCACCCDGFDBCBACBDCBABB	0.0002
FCACCCDGFDBCBACBEBBABB	0.0006

173

FCACCCDGFDBCBADBDBBABB	0.0022
FCACCCDGFDBCBADBDCBABB	0.0015
FCACCCDGFDBCBADBDEABBB	0.0002
FCACCCDGFDBCBADBEBBABB	0.0065
FCACCCDGFDBCBADBECBABB	0.0001
FCACCCFGFDBCBABBDEABBB	0.0001
FCACCCFGFDBCBABBEEABBB	0.0002
FCACCCFGFDBCBABBGEABBB	0.0027
FCACCCFGFDBCBADBDEABBB	0.0002
FCACCCFGFDBCBADBDFABBB	0.0004
FCACCCFGFDBCBADBDFBBBB	0.0002
FCACCCFGFDBCBADBEBBABB	0.0001
FCACCCFGFDBCBADBECBABB	0.0001
FCACCCFGFDBCBADBEEABBB	0.0013
FCACCCFGFDBCBADBEFABBB	0.0001
FCACCCFGFDBCBADBGBBABB	0.0002
FCACCCGBDDBCBABBHHABBB	0.0001
FCACCCGBDDBCBABBHHBABB	0.0001
FCACCCGBDDBCBDDBHHABBB	0.0007
FCACCCGBDDBCBDDBHHBABB	0.0005
FCACCCGBFDBCCDDBHHABBB	0.0001
FCACCCGBFDBCCDDBHHBABB	0.0003
FCACCCGDFDBCBABBEBBABB	0.0001
FCACCCGDFDBCBADBDCBABB	0.0002
FCACCCGEFDBCCABBEEABBB	0.0001
FCACCCGEFDBCCABBGCBABB	0.0001
FCACCCGEFDBCCADBEGABBB	0.0002
FCACCCGGDDBBBABBECBABB	0.0002
FCACCCGGDDBBBABBEEABBB	0.0015
FCACCCGGDDBBBADBGCBABB	0.0002
FCACCCGGDDBCBABBCABABB	0.0002
FCACCCGGDDBCBABBCBBABB	0.0012
FCACCCGGDDBCBABBDABABB	0.0009
FCACCCGGDDBCBABBDBBABB	0.0047
FCACCCGGDDBCBABBDCABBB	0.0001
FCACCCGGDDBCBABBDCBABB	0.0024
FCACCCGGDDBCBABBDDABBB	0.0013
FCACCCGGDDBCBABBDEABBB	0.0041
FCACCCGGDDBCBABBDEBBBB	0.0002
FCACCCGGDDBCBABBDFABBB	0.0019
FCACCCGGDDBCBABBDFBBBB	0.0001
FCACCCGGDDBCBABBDGABBB	0.0035
FCACCCGGDDBCBABBEABABB	0.0032
FCACCCGGDDBCBABBEBBABB	0.0127
FCACCCGGDDBCBABBECBABB	0.0014
FCACCCGGDDBCBABBEDABBB	0.0010
FCACCCGGDDBCBABBEEABBB	0.0131
FCACCCGGDDBCBABBEEBBBB	0.0011
FCACCCGGDDBCBABBEFABBB	0.0034
FCACCCGGDDBCBABBEFBBBB	0.0003
FCACCCGGDDBCBABBEGABBB	0.0029
FCACCCGGDDBCBABBGABABB	0.0002
FCACCCGGDDBCBABBGBBABB	0.0011
FCACCCGGDDBCBABBGCBABB	0.0018
FCACCCGGDDBCBABBGEABBB	0.0008
FCACCCGGDDBCBACBEABABB	0.0002
FCACCCGGDDBCBADBDABABB	0.0011
FCACCCGGDDBCBADBDBBABB	0.0017
FCACCCGGDDBCBADBDCBABB	0.0023
FCACCCGGDDBCBADBDEABBB	0.0011
FCACCCGGDDBCBADBDEBBBB	0.0002
FCACCCGGDDBCBADBDFABBB	0.0010
FCACCCGGDDBCBADBDGABBB	0.0050
FCACCCGGDDBCBADBEABABB	0.0025
FCACCCGGDDBCBADBEBBABB	0.0008
FCACCCGGDDBCBADBECBABB	0.0046
FCACCCGGDDBCBADBEEABBB	0.0020
FCACCCGGDDBCBADBEEBBBB	0.0002
FCACCCGGDDBCBADBEFABBB	0.0005
FCACCCGGDDBCBADBGCBABB	0.0004
FCACCCGGDDBCBADBGEABBB	0.0005
FCACCCGGEDBBBABBDEABBB	0.0001
FCACCCGGEDBCBABBDEABBB	0.0007
FCACCCGGEDBCBABBEBBABB	0.0001
FCACCCGGEDBCBABBECBABB	0.0002
FCACCCGGEDBCBABBEEABBB	0.0071
FCACCCGGEDBCBABBGEABBB	0.0004
FCACCCGGEDBCBADBCFABBB	0.0006
FCACCCGGEDBCBADBDCBABB	0.0001
FCBBAAGCDBBBBBBBHHABBB	0.0006
FCBBAAGCDBBBBDDBHHABBB	0.0001
FCBBAAGCDBBCBBBBHHABBB	0.0008
FCBBAAGCFBBBCBBBHHABBB	0.0001
FCBBAAGCFBBBCDDBHHABBB	0.0002
FCBBAAGCFBBCCBBBHHABBB	0.0002
FCBBAAGCFBBCCDDBHHABBB	0.0003

```
FCBBACGCDBBABBBBHHABBB          0.0001
FCBBACGCDBBBBBBBHHABBB          0.0008
FCBBACGCDBBBCDDBHHABBB          0.0001
FCBBACGCDBBCBBBBHHABBB          0.0013
FCBBACGCDBBCBBBBHHBBBB          0.0003
FCBBACGCDBBCBDDBHHABBB          0.0002
FCBBACGCFBBBCBBBHHABBB          0.0001
FCBBACGCFBBBCDDBHHABBB          0.0002
FCBBACGCFBBCCBBBHHABBB          0.0002
FCBBACGCFBBCCBBBHHBBBB          0.0001
FCBBACGCFBBCCDDBHHABBB          0.0010
FCBBACGCFBBCCDDBHHBBBB          0.0001
FCBBACGGDBBCBABBEGABBB          0.0004
FCBBACGGDBBCBABBEGBBBB          0.0001
FCBBACGGDBBCBADBEGABBB          0.0005
FCCBAAGCFBBBCBBBHHABBB          0.0014
FCCBAAGCFBBBCDDBHHABBB          0.0005
FCCBAAGCFBBCCBBBHHABBB          0.0038
FCCBAAGCFBBCCDDBHHABBB          0.0034
```

```
CONSEQUENCE MEASURE:
  IND.RISK OF FATALITY


  BASE CASE :
   PEACH BOTTOM LLH (MACCS)

  FRACTIONAL CONTRIBUTIONS OF EACH RELEASE TO MEAN RISK
                   RELEASE                 CONTRIBUTION
                   PCH  1D                   0.0000
                   PCH  2D                   0.0000
                   PCH  3D                   0.0009
                   PCH  4D                   0.0081
                   PCH  5D                   0.0348
                   PCH  6D                   0.4679
                   PCH  7D                   0.1008
                   PCH  8D                   0.1824
                   PCH  9D                   0.1318
                   PCH 10D                   0.0000
                   PCH 11D                   0.0000
                   PCH 12D                   0.0001
                   PCH 13D                   0.0000
                   PCH 14D                   0.0001
                   PCH 15D                   0.0001
                   PCH 16D                   0.0027
                   PCH 17D                   0.0000
                   PCH 18D                   0.0000
                   PCH 19D                   0.0005
                   PCH 20D                   0.0000
                   PCH 21D                   0.0011
                   PCH 22D                   0.0004
                   PCH 23D                   0.0027
                   PCH 24D                   0.0123
                   PCH 25D                   0.0000
                   PCH 26D                   0.0008
                   PCH 27D                   0.0020
                   PCH 28D                   0.0056
                   PCH 29D                   0.0062
                   PCH 30D                   0.0026
                   PCH 31D                   0.0037
                   PCH 32D                   0.0008
                   PCH 33D                   0.0003
                   PCH 34D                   0.0011
                   PCH 35D                   0.0000
                   PCH 36D                   0.0043
                   PCH 37D                   0.0052
                   PCH 38D                   0.0006
                   PCH 39D                   0.0011
                   PCH 40D                   0.0000
                   PCH 41D                   0.0014
                   PCH 42D                   0.0014
                   PCH 43D                   0.0008
                   PCH 44D                   0.0003
                   PCH 45D                   0.0036
                   PCH 46D                   0.0008
                   PCH 47D                   0.0010
                   PCH 48D                   0.0081
                   PCH 49D                   0.0000
                   PCH 50D                   0.0004
                   PCH 51D                   0.0010
                   PCH 52D                   0.0001
                   PCH 53D                   0.0000
                   PCH 54D                   0.0000
```

```
CONSEQUENCE MEASURE:
 IND.RISK OF FATALITY

 SENSITIVITY OF RISK TO ISSUES
 DISTRIBUTION OF RISK AT EACH LEVEL OF EACH ISSUE
 BASE CASE :
  PEACH BOTTOM LLH (MACCS)

GP ISS LVL NUM      5%          50%         MEAN         95%         R**2    F   DF       SIGNIF.
 1   1   1  15  0.1584E-09  0.6580E-09  0.1448E-08  0.6054E-08    0.02    1.1(  3,146)   0.34NS
         2  60  0.6095E-10  0.9242E-09  0.2678E-08  0.1282E-07
         3  60  0.7378E-10  0.9115E-09  0.3972E-08  0.2663E-07
         4  15  0.3009E-09  0.1825E-08  0.4128E-08  0.2192E-07
 1   2   1  15  0.6704E-10  0.4563E-09  0.6580E-09  0.2513E-08    0.24   15.7(  3,146)   0.00**
         2  60  0.3402E-10  0.7131E-09  0.9953E-09  0.2970E-08
         3  60  0.8853E-10  0.9988E-09  0.1668E-08  0.4591E-08
         4  15  0.1037E-08  0.1484E-07  0.2087E-07  0.5609E-07
 1   3   1  15  0.1030E-09  0.9246E-09  0.1123E-08  0.3133E-08    0.04    2.0(  3,146)   0.12NS
         2  60  0.4750E-10  0.8637E-09  0.1914E-08  0.3760E-08
         3  60  0.8058E-10  0.8684E-09  0.4542E-08  0.2496E-07
         4  15  0.3204E-09  0.1493E-08  0.5230E-08  0.2858E-07
 1   4   2  62  0.6663E-10  0.1016E-08  0.2505E-08  0.1445E-07    0.00    0.1(  1,148)   0.76NS
         1  88  0.8093E-10  0.8637E-09  0.3720E-08  0.2799E-07
 1   5   1  15  0.1820E-10  0.1541E-09  0.2294E-08  0.1720E-07    0.09    5.0(  3,146)   0.00**
         3  60  0.8193E-10  0.1190E-08  0.2398E-08  0.8419E-08
         2  60  0.1290E-09  0.7832E-09  0.3610E-08  0.2539E-07
         4  15  0.9308E-10  0.2309E-08  0.5851E-08  0.3285E-07
 2   1   1  15  0.1045E-09  0.8302E-09  0.1405E-08  0.5288E-08    0.00    0.1(  3,146)   0.97NS
         2  60  0.5101E-10  0.9740E-09  0.2643E-08  0.9530E-08
         4  15  0.7804E-10  0.6604E-09  0.3615E-08  0.2218E-07
         3  60  0.8193E-10  0.9434E-09  0.4147E-08  0.2539E-07
 2   2   1  15  0.6704E-10  0.9557E-09  0.2627E-08  0.1398E-07    0.01    0.6(  3,146)   0.60NS
         3  60  0.5014E-10  0.6060E-09  0.3029E-08  0.5892E-08
         2  60  0.9869E-10  0.9974E-09  0.3179E-08  0.1452E-07
         4  15  0.1824E-10  0.6580E-09  0.4719E-08  0.2955E-07
 2   3   3  60  0.4366E-10  0.8975E-09  0.2275E-08  0.1282E-07    0.01    0.4(  3,146)   0.75NS
         4  15  0.1030E-09  0.1176E-08  0.3220E-08  0.1766E-07
         2  60  0.1101E-09  0.1055E-08  0.3737E-08  0.2345E-07
         1  15  0.8508E-10  0.6941E-09  0.4910E-08  0.3035E-07
 2   4   4  15  0.2604E-10  0.7461E-09  0.9908E-09  0.2983E-08    0.01    0.7(  3,146)   0.56NS
         1  15  0.1407E-10  0.9557E-09  0.1087E-08  0.3162E-08
         2  60  0.1206E-09  0.9740E-09  0.3400E-08  0.1721E-07
         3  60  0.6988E-10  0.1055E-08  0.4125E-08  0.2983E-07
 2   5   1 126  0.6809E-10  0.9652E-09  0.3138E-08  0.1575E-07    0.00    0.0(  1,148)   0.84NS
         2  24  0.1339E-09  0.9236E-09  0.3635E-08  0.1199E-07
 2   6   4   9  0.7823E-10  0.9557E-09  0.9803E-09  0.3179E-08    0.03    0.6(  8,141)   0.80NS
         7  20  0.9595E-10  0.8403E-09  0.1195E-08  0.3691E-08
         8  16  0.1241E-10  0.8950E-09  0.1232E-08  0.3239E-08
         2  11  0.2160E-09  0.1091E-08  0.1251E-08  0.3076E-08
         9  12  0.7133E-10  0.8247E-09  0.1679E-08  0.6942E-08
         1   2************************  0.2553E-08************
         5  22  0.6514E-10  0.1271E-08  0.3660E-08  0.2608E-07
         6  38  0.6739E-10  0.6972E-09  0.5270E-08  0.3876E-07
         3  20  0.1022E-09  0.1702E-08  0.5302E-08  0.2663E-07
 2   7   2  94  0.8890E-10  0.9406E-09  0.2830E-08  0.7250E-08    0.01    0.7(  2,147)   0.52NS
         3  51  0.3714E-10  0.9805E-09  0.3668E-08  0.1966E-07
 2   8   1  15  0.1370E-10  0.1070E-08  0.1434E-08  0.4984E-08    0.00    0.0(  1,148)   1.00NS
         2 135  0.8168E-10  0.9557E-09  0.3416E-08  0.1853E-07
 2   9   2  75  0.6022E-10  0.9626E-09  0.3175E-08  0.1395E-07    0.00    0.4(  1,148)   0.51NS
         1  75  0.8481E-10  0.9557E-09  0.3261E-08  0.1833E-07
 2  10   2  75  0.6605E-10  0.9257E-09  0.2698E-08  0.6106E-08    0.01    1.0(  1,148)   0.32NS
         1  75  0.9381E-10  0.9801E-09  0.3738E-08  0.2192E-07
 2  11   4   4************************  0.9759E-09************    0.04    2.1(  3,146)   0.10NS
         1  16  0.1696E-10  0.3365E-09  0.9877E-09  0.3990E-08
         2  80  0.8511E-10  0.9713E-09  0.2963E-08  0.1452E-07
         3  50  0.9647E-10  0.1129E-08  0.4519E-08  0.3230E-07
 2  12   2  45  0.3507E-10  0.6137E-09  0.1806E-08  0.6452E-08    0.04    1.7(  4,145)   0.16NS
         3  38  0.8816E-10  0.9120E-09  0.1965E-08  0.7697E-08
         4  22  0.3443E-10  0.1042E-08  0.4046E-08  0.1454E-07
         1  30  0.1109E-09  0.1105E-08  0.4672E-08  0.3230E-07
         5  15  0.7566E-10  0.2147E-08  0.6504E-08  0.3616E-07
 2  13   2  75  0.7165E-10  0.9226E-09  0.2715E-08  0.1460E-07    0.01    0.9(  2,147)   0.41NS
         1  60  0.9522E-10  0.1034E-08  0.3644E-08  0.1282E-07
         3  15  0.5206E-10  0.1070E-08  0.4028E-08  0.2360E-07
 2  14   2  75  0.4143E-10  0.5603E-09  0.2126E-08  0.9260E-08    0.14   24.0(  1,148)   0.00**
         1  75  0.1889E-09  0.1499E-08  0.4309E-08  0.2622E-07
 2  15   1  60  0.7378E-10  0.9424E-09  0.2066E-08  0.5919E-08    0.00    0.0(  1,148)   0.86NS
         2  90  0.8124E-10  0.9618E-09  0.3986E-08  0.2262E-07
 2  16   2  75  0.7165E-10  0.9226E-09  0.2436E-08  0.1041E-07    0.00    0.4(  1,148)   0.54NS
         1  75  0.8891E-10  0.9679E-09  0.3999E-08  0.2622E-07
 2  17   2 120  0.6591E-10  0.8238E-09  0.2687E-08  0.1452E-07    0.04    5.6(  1,148)   0.02 *
         1  30  0.1524E-09  0.1390E-08  0.4540E-08  0.3230E-07
 3   1   4   3************************  0.7996E-09************    0.04    2.0(  3,146)   0.12NS
         3  39  0.1027E-09  0.1390E-08  0.2879E-08  0.1327E-07
         2  74  0.6332E-10  0.7425E-09  0.3360E-08  0.1252E-07
         1  34  0.6380E-10  0.9406E-09  0.3494E-08  0.2648E-07
```

```
3   2   4  15  0.9557E-10  0.7372E-09  0.1147E-08  0.3201E-08    0.02    1.2(  3,146)   0.33NS
        1  29  0.7526E-10  0.6604E-09  0.1480E-08  0.6185E-08
        3  51  0.1116E-09  0.9679E-09  0.1515E-08  0.5642E-08
        2  55  0.3785E-10  0.1108E-08  0.6278E-08  0.4332E-07
3   3   1  14  0.4947E-10  0.8297E-09  0.8208E-09  0.1812E-08    0.01    0.5(  4,145)   0.74NS
        5   7  0.5950E-10  0.1381E-08  0.2431E-08  0.6064E-08
        3  36  0.2841E-09  0.9525E-09  0.2639E-08  0.1255E-07
        4  35  0.4529E-10  0.8174E-09  0.3275E-08  0.1566E-07
        2  58  0.7292E-10  0.1016E-08  0.4216E-08  0.2151E-07
3   4   5   5  0.8917E-10  0.5683E-09  0.9490E-09  0.2147E-08    0.02    0.6(  4,145)   0.67NS
        1  15  0.1668E-09  0.9257E-09  0.1378E-08  0.5129E-08
        2  76  0.4556E-10  0.8966E-09  0.3122E-08  0.1826E-07
        3  30  0.6958E-10  0.9987E-09  0.3310E-08  0.7563E-08
        4  24  0.9103E-10  0.1118E-08  0.5030E-08  0.3633E-07
3   5   1   4************************  0.5392E-09************    0.10    4.1(  4,145)   0.00**
        3  46  0.7766E-10  0.9105E-09  0.1472E-08  0.4299E-08
        2  35  0.8504E-10  0.5392E-09  0.2336E-08  0.1742E-07
        4  50  0.6243E-10  0.1175E-08  0.4604E-08  0.3230E-07
        5  15  0.7987E-09  0.1510E-08  0.6722E-08  0.4221E-07
3   6   1   4************************  0.1314E-08************    0.01    0.3(  3,146)   0.83NS
        2  47  0.6194E-10  0.9246E-09  0.2113E-08  0.5077E-08
        4  23  0.8239E-10  0.1070E-08  0.2162E-08  0.6317E-08
        3  76  0.6680E-10  0.8637E-09  0.4321E-08  0.2501E-07
3   7   3  55  0.1266E-09  0.1015E-08  0.2206E-08  0.4411E-08    0.02    0.9(  3,146)   0.45NS
        2  62  0.6663E-10  0.9406E-09  0.3632E-08  0.1445E-07
        1  18  0.4104E-10  0.6065E-09  0.3656E-08  0.2092E-07
        4  15  0.2266E-09  0.1108E-08  0.4692E-08  0.2955E-07
3   8   1  25  0.5284E-10  0.4416E-09  0.6946E-09  0.1794E-08    0.12    6.7(  3,146)   0.00**
        3  52  0.2274E-09  0.1520E-08  0.3360E-08  0.1478E-07
        2  58  0.4412E-10  0.7537E-09  0.3488E-08  0.2546E-07
        4  15  0.2920E-09  0.1101E-08  0.5886E-08  0.3918E-07
3   9   1  12  0.1038E-10  0.7406E-09  0.1129E-08  0.4473E-08    0.02    1.1(  3,146)   0.37NS
        2  27  0.5363E-10  0.8712E-09  0.1409E-08  0.4671E-08
        4  54  0.6008E-10  0.9974E-09  0.2377E-08  0.3799E-08
        3  57  0.1770E-09  0.9679E-09  0.5311E-08  0.3055E-07
3  10   1   7  0.3614E-10  0.4861E-09  0.9692E-09  0.2661E-08    0.02    1.0(  3,146)   0.39NS
        2  49  0.5498E-10  0.1015E-08  0.2032E-08  0.6327E-08
        3  73  0.9192E-10  0.8712E-09  0.2819E-08  0.1087E-07
        4  21  0.2176E-09  0.1352E-08  0.8118E-08  0.5299E-07
3  11   1  75  0.7897E-10  0.9626E-09  0.2401E-08  0.6106E-08    0.00    0.0(  1,148)   1.00NS
        2  75  0.6704E-10  0.9557E-09  0.4035E-08  0.2192E-07
3  12   2  50  0.3203E-10  0.9158E-09  0.2395E-08  0.6120E-08    0.02    1.1(  2,147)   0.32NS
        3  50  0.6958E-10  0.9105E-09  0.2409E-08  0.7563E-08
        1  50  0.1312E-09  0.1043E-08  0.4849E-08  0.3230E-07
3  13   4  37  0.1008E-09  0.9805E-09  0.1872E-08  0.5355E-08    0.03    1.3(  3,146)   0.26NS
        1  38  0.6832E-10  0.6737E-09  0.2659E-08  0.1011E-07
        3  38  0.9655E-10  0.1015E-08  0.4025E-08  0.1773E-07
        2  37  0.3341E-10  0.1017E-08  0.4308E-08  0.3055E-07
3  14   3  30  0.6243E-10  0.9300E-09  0.1722E-08  0.6120E-08    0.01    0.2(  4,145)   0.91NS
        4  30  0.1524E-09  0.9974E-09  0.2007E-08  0.7563E-08
        1  30  0.6958E-10  0.1140E-08  0.3076E-08  0.2755E-07
        5  30  0.5950E-10  0.7999E-09  0.3997E-08  0.2262E-07
        2  30  0.7823E-10  0.8981E-09  0.5287E-08  0.4866E-07
4   1   6  19  0.4869E-10  0.6137E-09  0.9847E-09  0.3590E-08    0.06    1.3(  7,142)   0.26NS
        3  19  0.1966E-09  0.8105E-09  0.1305E-08  0.5124E-08
        4  19  0.5622E-10  0.1684E-08  0.1598E-08  0.3063E-08
        2  18  0.6066E-10  0.1151E-08  0.2660E-08  0.1458E-07
        8  19  0.9060E-10  0.7461E-09  0.3740E-08  0.2601E-07
        1  19  0.2272E-10  0.6473E-09  0.4299E-08  0.1892E-07
        5  19  0.3813E-09  0.1176E-08  0.5015E-08  0.2525E-07
        7  18  0.2636E-10  0.7737E-09  0.6271E-08  0.3876E-07
NS=NOT SIGNIFICANT, *=SIGNIFICANT (P<.05), **=SIGNIFICANT (P<.01)
```

```
      CONSEQUENCE MEASURE:  IND.RISK OF FATALITY
0     ISSUE GROUP =   1   ISSUE =   1   SLC FAILURE TO ACTUATE

      LEVEL 1 NO.<MED.=  8 NO. EXP.=  7     NO.>=MED.=  7 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
      LEVEL 2 NO.<MED.= 31 NO. EXP.= 30     NO.>=MED.= 29 NO. EXP.= 30   CHI-SQ.=   0.1 DF= 1 SIG.= 0.796
      LEVEL 3 NO.<MED.= 31 NO. EXP.= 30     NO.>=MED.= 29 NO. EXP.= 30   CHI-SQ.=   0.1 DF= 1 SIG.= 0.796
      LEVEL 4 NO.<MED.=  4 NO. EXP.=  7     NO.>=MED.= 11 NO. EXP.=  8   CHI-SQ.=   2.4 DF= 1 SIG.= 0.120
      OVERALL CHI-SQ=   2.8 DF=  7  SIG.= 0.902

0     ISSUE GROUP =   1   ISSUE =   2   DC COMMON MODE

      LEVEL 1 NO.<MED.= 13 NO. EXP.=  7     NO.>=MED.=  2 NO. EXP.=  8   CHI-SQ.=   9.6 DF= 1 SIG.= 0.002
      LEVEL 2 NO.<MED.= 34 NO. EXP.= 30     NO.>=MED.= 26 NO. EXP.= 30   CHI-SQ.=   1.1 DF= 1 SIG.= 0.302
      LEVEL 3 NO.<MED.= 27 NO. EXP.= 30     NO.>=MED.= 33 NO. EXP.= 30   CHI-SQ.=   0.6 DF= 1 SIG.= 0.439
      LEVEL 4 NO.<MED.=  0 NO. EXP.=  7     NO.>=MED.= 15 NO. EXP.=  8   CHI-SQ.=  13.1 DF= 1 SIG.= 0.000
      OVERALL CHI-SQ=  24.4 DF=  7  SIG.= 0.001

0     ISSUE GROUP =   1   ISSUE =   3   FAILURE TO VENT

      LEVEL 1 NO.<MED.=  8 NO. EXP.=  7     NO.>=MED.=  7 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
      LEVEL 2 NO.<MED.= 32 NO. EXP.= 30     NO.>=MED.= 28 NO. EXP.= 30   CHI-SQ.=   0.3 DF= 1 SIG.= 0.606
      LEVEL 3 NO.<MED.= 31 NO. EXP.= 30     NO.>=MED.= 29 NO. EXP.= 30   CHI-SQ.=   0.1 DF= 1 SIG.= 0.796
      LEVEL 4 NO.<MED.=  3 NO. EXP.=  7     NO.>=MED.= 12 NO. EXP.=  8   CHI-SQ.=   4.3 DF= 1 SIG.= 0.038
      OVERALL CHI-SQ=   4.9 DF=  7  SIG.= 0.674

0     ISSUE GROUP =   1   ISSUE =   4   SW MOD A VS. MOD B

      LEVEL 1 NO.<MED.= 46 NO. EXP.= 44     NO.>=MED.= 42 NO. EXP.= 44   CHI-SQ.=   0.2 DF= 1 SIG.= 0.670
      LEVEL 2 NO.<MED.= 28 NO. EXP.= 31     NO.>=MED.= 34 NO. EXP.= 31   CHI-SQ.=   0.6 DF= 1 SIG.= 0.446
      OVERALL CHI-SQ=   0.8 DF=  3  SIG.= 0.858

0     ISSUE GROUP =   1   ISSUE =   5   POWER RECOVERY

      LEVEL 1 NO.<MED.= 11 NO. EXP.=  7     NO.>=MED.=  4 NO. EXP.=  8   CHI-SQ.=   4.3 DF= 1 SIG.= 0.038
      LEVEL 2 NO.<MED.= 35 NO. EXP.= 30     NO.>=MED.= 25 NO. EXP.= 30   CHI-SQ.=   1.7 DF= 1 SIG.= 0.197
      LEVEL 3 NO.<MED.= 24 NO. EXP.= 30     NO.>=MED.= 36 NO. EXP.= 30   CHI-SQ.=   2.4 DF= 1 SIG.= 0.121
      LEVEL 4 NO.<MED.=  4 NO. EXP.=  7     NO.>=MED.= 11 NO. EXP.=  8   CHI-SQ.=   2.4 DF= 1 SIG.= 0.120
      OVERALL CHI-SQ=  10.8 DF=  7  SIG.= 0.149

0     ISSUE GROUP =   2   ISSUE =   1   PROB. OF STUCK OPEN VAC. BRKR.

      LEVEL 1 NO.<MED.=  8 NO. EXP.=  7     NO.>=MED.=  7 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
      LEVEL 2 NO.<MED.= 28 NO. EXP.= 30     NO.>=MED.= 32 NO. EXP.= 30   CHI-SQ.=   0.3 DF= 1 SIG.= 0.606
      LEVEL 3 NO.<MED.= 30 NO. EXP.= 30     NO.>=MED.= 30 NO. EXP.= 30   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
      LEVEL 4 NO.<MED.=  8 NO. EXP.=  7     NO.>=MED.=  7 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
      OVERALL CHI-SQ=   0.8 DF=  7  SIG.= 0.997

0     ISSUE GROUP =   2   ISSUE =   2   HPSW-SPRAY

      LEVEL 1 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
```

```
     LEVEL 2 NO.<MED.= 26 NO. EXP.= 30     NO.>=MED.= 34 NO. EXP.= 30   CHI-SQ.=   1.1 DF= 1 SIG.= 0.302
     LEVEL 3 NO.<MED.= 33 NO. EXP.= 30     NO.>=MED.= 27 NO. EXP.= 30   CHI-SQ.=   0.6 DF= 1 SIG.= 0.439
     LEVEL 4 NO.<MED.=  8 NO. EXP.=  7     NO.>=MED.=  7 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
     OVERALL CHI-SQ=   1.9 DF=  7  SIG.= 0.963

0    ISSUE GROUP =   2   ISSUE =   3   VENT-SBO-NACR

     LEVEL 1 NO.<MED.=  9 NO. EXP.=  7     NO.>=MED.=  6 NO. EXP.=  8   CHI-SQ.=   1.1 DF= 1 SIG.= 0.301
     LEVEL 2 NO.<MED.= 27 NO. EXP.= 30     NO.>=MED.= 33 NO. EXP.= 30   CHI-SQ.=   0.6 DF= 1 SIG.= 0.439
     LEVEL 3 NO.<MED.= 31 NO. EXP.= 30     NO.>=MED.= 29 NO. EXP.= 30   CHI-SQ.=   0.1 DF= 1 SIG.= 0.796
     LEVEL 4 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   1.7 DF=  7  SIG.= 0.973

0    ISSUE GROUP =   2   ISSUE =   4   VENT-SBO-ACR

     LEVEL 1 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 2 NO.<MED.= 28 NO. EXP.= 30     NO.>=MED.= 32 NO. EXP.= 30   CHI-SQ.=   0.3 DF= 1 SIG.= 0.606
     LEVEL 3 NO.<MED.= 29 NO. EXP.= 30     NO.>=MED.= 31 NO. EXP.= 30   CHI-SQ.=   0.1 DF= 1 SIG.= 0.796
     LEVEL 4 NO.<MED.= 10 NO. EXP.=  7     NO.>=MED.=  5 NO. EXP.=  8   CHI-SQ.=   2.4 DF= 1 SIG.= 0.120
     OVERALL CHI-SQ=   2.7 DF=  7  SIG.= 0.908

0    ISSUE GROUP =   2   ISSUE =   5   SP BYPASS, SMALL/LARGE

     LEVEL 1 NO.<MED.= 61 NO. EXP.= 63     NO.>=MED.= 65 NO. EXP.= 63   CHI-SQ.=   0.1 DF= 1 SIG.= 0.722
     LEVEL 2 NO.<MED.= 13 NO. EXP.= 12     NO.>=MED.= 11 NO. EXP.= 12   CHI-SQ.=   0.2 DF= 1 SIG.= 0.683
     OVERALL CHI-SQ=   0.3 DF=  3  SIG.= 0.961

0    ISSUE GROUP =   2   ISSUE =   6   CONT FAILURE PRESS. (T<500F B VB)

     LEVEL 1 NO.<MED.=  1 NO. EXP.=  1     NO.>=MED.=  1 NO. EXP.=  1   TEST CANNOT BE RUN; EXP. NO. < 3
     LEVEL 2 NO.<MED.=  5 NO. EXP.=  5     NO.>=MED.=  6 NO. EXP.=  6   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 3 NO.<MED.=  7 NO. EXP.= 10     NO.>=MED.= 13 NO. EXP.= 10   CHI-SQ.=   1.8 DF= 1 SIG.= 0.180
     LEVEL 4 NO.<MED.=  4 NO. EXP.=  4     NO.>=MED.=  5 NO. EXP.=  5   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 5 NO.<MED.=  9 NO. EXP.= 11     NO.>=MED.= 13 NO. EXP.= 11   CHI-SQ.=   0.7 DF= 1 SIG.= 0.394
     LEVEL 6 NO.<MED.= 21 NO. EXP.= 19     NO.>=MED.= 17 NO. EXP.= 19   CHI-SQ.=   0.4 DF= 1 SIG.= 0.516
     LEVEL 7 NO.<MED.= 12 NO. EXP.= 10     NO.>=MED.=  8 NO. EXP.= 10   CHI-SQ.=   0.8 DF= 1 SIG.= 0.371
     LEVEL 8 NO.<MED.=  8 NO. EXP.=  8     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 9 NO.<MED.=  7 NO. EXP.=  6     NO.>=MED.=  5 NO. EXP.=  6   CHI-SQ.=   0.3 DF= 1 SIG.= 0.564
     OVERALL CHI-SQ=   4.1 DF= 15  SIG.= 0.997

0    ISSUE GROUP =   2   ISSUE =   7   LATE FAILURE LOCATION (800-1200 A VB)

     LEVEL 1 NO.<MED.=  2 NO. EXP.=  2     NO.>=MED.=  3 NO. EXP.=  3   TEST CANNOT BE RUN; EXP. NO. < 3
     LEVEL 2 NO.<MED.= 47 NO. EXP.= 47     NO.>=MED.= 47 NO. EXP.= 47   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 3 NO.<MED.= 25 NO. EXP.= 25     NO.>=MED.= 26 NO. EXP.= 26   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   0.0 DF=  3  SIG.= 1.000

0    ISSUE GROUP =   2   ISSUE =   8   CONT FAILURE SIZE, RAPID PRESS.
```

```
    LEVEL 1 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
    LEVEL 2 NO.<MED.= 67 NO. EXP.= 67     NO.>=MED.= 68 PO. EXP.= 68   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
    OVERALL CHI-SQ=   0.0 DF=  3  SIG.= 1.000

0   ISSUE GROUP =   2   ISSUE =   9   CONT FAILURE SIZE, SLOW PRESS.

    LEVEL 1 NO.<MED.= 37 NO. EXP.= 37     NO.>=MED.= 38 NO. EXP.= 38   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
    LEVEL 2 NO.<MED.= 37 NO. EX?.= 37     NO.>=MED.= 38 NO. EXP.= 38   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
    OVERALL CHI-SQ=   0.0 DF=  3  SIG.= 1.000

0   ISSUE GROUP =   2   ISSUE =  10   VB MODE, HIGH-P FLOW MELT

    LEVEL 1 NO.<MED.= 36 NO. EXP.= 37     NO.>=MED.= 39 NO. EXP.= 38   CHI-SQ.=   0.1 DF= 1 SIG.= 0.817
    LEVEL 2 NO.<MED.= 38 NO. EXP.= 37     NO.>=MED.= 37 NO. EXP.= 38   CHI-SQ.=   0.1 DF= 1 SIG.= 0.817
    OVERALL CHI-SQ=   0.1 DF=  3  SIG.= 0.991

0   ISSUE GROUP =   2   ISSUE =  11   CONT PRESS. BEFORE VB, LONG TERM TB

    LEVEL 1 NO.<MED.= 11 NO. EXP.=  8     NO.>=MED.=  5 NO. EXP.=  8   CHI-SQ.=   2.3 DF= 1 SIG.= 0.134
    LEVEL 2 NO.<MED.= 38 NO. EXP.= 40     NO.>=MED.= 42 NO. EXP.= 40   CHI-SQ.=   0.2 DF= 1 SIG.= 0.655
    LEVEL 3 NO.<MED.= 22 NO. EXP.= 25     NO.>=MED.= 28 NO. EXP.= 25   CHI-SQ.=   0.7 DF= 1 SIG.= 0.396
    LEVEL 4 NO.<MED.=  3 NO. EXP.=  2     NO.>=MED.=  1 NO. EXP.=  2   TEST CANNOT BE RUN; EXP. NO. < 3
    OVERALL CHI-SQ=   3.2 DF=  5  SIG.= 0.674

0   ISSUE GROUP =   2   ISSUE =  12   PRESSURE RISE AT VB

    LEVEL 1 NO.<MED.= 13 NO. EXP.= 15     NO.>=MED.= 17 NO. EXP.= 15   CHI-SQ.=   0.5 DF= 1 SIG.= 0.465
    LEVEL 2 NO.<MED.= 26 NO. EXP.= 22     NO.>=MED.= 19 NO. EXP.= 23   CHI-SQ.=   1.4 DF= 1 SIG.= 0.233
    LEVEL 3 NO.<MED.= 20 NO. EXP.= 19     NO.>=MED.= 18 NO. EXP.= 19   CHI-SQ.=   0.1 DF= 1 SIG.= 0.746
    LEVEL 4 NO.<MED.= 10 NO. EXP.= 11     NO.>=MED.= 12 NO. EXP.= 11   CHI-SQ.=   0.2 DF= 1 SIG.= 0.670
    LEVEL 5 NO.<MED.=  5 NO. EXP.=  7     NO.>=MED.= 10 NO. EXP.=  8   CHI-SQ.=   1.1 DF= 1 SIG.= 0.301
    OVERALL CHI-SQ=   3.3 DF=  9  SIG.= 0.951

0   ISSUE GROUP =   2   ISSUE =  13   DELTA P DUE TO SUMP WATER INTERACT.

    LEVEL 1 NO.<MED.= 28 NO. EXP.= 30     NO.>=MED.= 32 NO. EXP.= 30   CHI-SQ.=   0.3 DF= 1 SIG.= 0.606
    LEVEL 2 NO.<MED.= 39 NO. EXP.= 37     NO.>=MED.= 36 NO. EXP.= 38   CHI-SQ.=   0.2 DF= 1 SIG.= 0.644
    LEVEL 3 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
    OVERALL CHI-SQ=   0.5 DF=  5  SIG.= 0.993

0   ISSUE GROUP =   2   ISSUE =  14   PROB OF DRY DW MELT THROUGH

    LEVEL 1 NO.<MED.= 23 NO. EXP.= 37     NO.>=MED.= 52 NO. EXP.= 38   CHI-SQ.=  10.5 DF= 1 SIG.= 0.001
    LEVEL 2 NO.<MED.= 51 NO. EXP.= 37     NO.>=MED.= 24 NO. EXP.= 38   CHI-SQ.=  10.5 DF= 1 SIG.= 0.001
    OVERALL CHI-SQ=  20.9 DF=  3  SIG.= 0.000

0   ISSUE GROUP =   2   ISSUE =  15   PROB OF WET DW MELT THROUGH

    LEVEL 1 NO.<MED.= 30 NO. EXP.= 30     NO.>=MED.= 30 NO. EXP.= 30   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
    LEVaL 2 NO.<MED.= 44 NO. EXP.= 45     NO.>=MED.= 46 NO. EXP.= 45   CHI-SQ.=   0.0 DF= 1 SIG.= 0.833
```

```
     OVERALL CHI-SQ=   0.0 DF=  3  SIG.= 0.998

0    ISSUE GROUP =   2   ISSUE =  16   PROB OF DW M-THRU W/HI-P MELT EJECT

     LEVEL 1 NO.<MED.= 36 NO. EXP.= 37     NO.>=MED.= 39 NO. EXP.= 38   CHI-SQ.=   0.1 DF= 1 SIG.= 0.817
     LEVEL 2 NO.<MED.= 38 NO. EXP.= 37     NO.>=MED.= 37 NO. EXP.= 38   CHI-SQ.=   0.1 DF= 1 SIG.= 0.817
     OVERALL CHI-SQ=   0.1 DF=  3  SIG.= 0.991

0    ISSUE GROUP =   2   ISSUE =  17   PROB OF H2 BURNS IN RB LEADING TO BP

     LEVEL 1 NO.<MED.=  8 NO. EXP.= 15     NO.>=MED.= 22 NO. EXP.= 15   CHI-SQ.=   6.5 DF= 1 SIG.= 0.011
     LEVEL 2 NO.<MED.= 66 NO. EXP.= 60     NO.>=MED.= 54 NO. EXP.= 60   CHI-SQ.=   1.2 DF= 1 SIG.= 0.273
     OVERALL CHI-SQ=   7.7 DF=  3  SIG.= 0.052

0    ISSUE GROUP =   3   ISSUE =   1   IN-VES RELEASE FROM FUEL

     LEVEL 1 NO.<MED.= 17 NO. EXP.= 17     NO.>=MED.= 17 NO. EXP.= 17   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 2 NO.<MED.= 42 NO. EXP.= 37     NO.>=MED.= 32 NO. EXP.= 37   CHI-SQ.=   1.4 DF= 1 SIG.= 0.245
     LEVEL 3 NO.<MED.= 13 NO. EXP.= 19     NO.>=MED.= 26 NO. EXP.= 20   CHI-SQ.=   3.7 DF= 1 SIG.= 0.055
     LEVEL 4 NO.<MED.=  2 NO. EXP.=  1     NO.>=MED.=  1 NO. EXP.=  2   TEST CANNOT BE RUN; EXP. NO. < 3
     OVERALL CHI-SQ=   5.0 DF=  5  SIG.= 0.410

0    ISSUE GROUP =   3   ISSUE =   2   CSI DECOMP

     LEVEL 1 NO.<MED.= 18 NO. EXP.= 14     NO.>=MED.= 11 NO. EXP.= 15   CHI-SQ.=   2.2 DF= 1 SIG.= 0.137
     LEVEL 2 NO.<MED.= 23 NO. EXP.= 27     NO.>=MED.= 32 NO. EXP.= 28   CHI-SQ.=   1.2 DF= 1 SIG.= 0.281
     LEVEL 3 NO.<MED.= 24 NO. EXP.= 25     NO.>=MED.= 27 NO. EXP.= 26   CHI-SQ.=   0.1 DF= 1 SIG.= 0.779
     LEVEL 4 NO.<MED.=  9 NO. EXP.=  7     NO.>=MED.=  6 NO. EXP.=  8   CHI-SQ.=   1.1 DF= 1 SIG.= 0.301
     OVERALL CHI-SQ=   4.5 DF=  7  SIG.= 0.718

0    ISSUE GROUP =   3   ISSUE =   3   FRAC IN-VES RETENTION LEAKED, AT VB

     LEVEL 1 NO.<MED.=  8 NO. EXP.=  7     NO.>=MED.=  6 NO. EXP.=  7   CHI-SQ.=   0.3 DF= 1 SIG.= 0.593
     LEVEL 2 NO.<MED.= 27 NO. EXP.= 29     NO.>=MED.= 31 NO. EXP.= 29   CHI-SQ.=   0.3 DF= 1 SIG.= 0.599
     LEVEL 3 NO.<MED.= 18 NO. EXP.= 18     NO.>=MED.= 18 NO. EXP.= 18   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 4 NO.<MED.= 18 NO. EXP.= 17     NO.>=MED.= 17 NO. EXP.= 18   CHI-SQ.=   0.1 DF= 1 SIG.= 0.735
     LEVEL 5 NO.<MED.=  3 NO. EXP.=  3     NO.>=MED.=  4 NO. EXP.=  4   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   0.7 DF=  9  SIG.= 1.000

0    ISSUE GROUP =   3   ISSUE =   4   S POOL DF

     LEVEL 1 NO.<MED.=  8 NO. EXP.=  7     NO.>=MED.=  7 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
     LEVEL 2 NO.<MED.= 40 NO. EXP.= 38     NO.>=MED.= 36 NO. EXP.= 38   CHI-SQ.=   0.2 DF= 1 SIG.= 0.646
     LEVEL 3 NO.<MED.= 13 NO. EXP.= 15     NO.>=MED.= 17 NO. EXP.= 15   CHI-SQ.=   0.5 DF= 1 SIG.= 0.465
     LEVEL 4 NO.<MED.= 10 NO. EXP.= 12     NO.>=MED.= 14 NO. EXP.= 12   CHI-SQ.=   0.7 DF= 1 SIG.= 0.414
     LEVEL 5 NO.<MED.=  3 NO. EXP.=  2     NO.>=MED.=  2 NO. EXP.=  3   TEST CANNOT BE RUN; EXP. NO. < 3
     OVERALL CHI-SQ=   1.7 DF=  7  SIG.= 0.975

0    ISSUE GROUP =   3   ISSUE =   5   S POOL DF, VOL I
```

```
     LEVEL 1 NO.<MED.=  3 NO. EXP.=  2     NO.>=MED.=  1 NO. EXP.=  2   TEST CANNOT BE RUN; EXP. NO. < 3
     LEVEL 2 NO.<MED.= 23 NO. EXP.= 17     NO.>=MED.= 12 NO. EXP.= 18   CHI-SQ.=   4.1 DF= 1 SIG.= 0.042
     LEVEL 3 NO.<MED.= 25 NO. EXP.= 23     NO.>=MED.= 21 NO. EXP.= 23   CHI-SQ.=   0.3 DF= 1 SIG.= 0.555
     LEVEL 4 NO.<MED.= 20 NO. EXP.= 25     NO.>=MED.= 30 NO. EXP.= 25   CHI-SQ.=   2.0 DF= 1 SIG.= 0.157
     LEVEL 5 NO.<MED.=  3 NO. EXP.=  7     NO.>=MED.= 12 NO. EXP.=  8   CHI-SQ.=   4.3 DF= 1 SIG.= 0.038
     OVERALL CHI-SQ=  10.8 DF=  7  SIG.= 0.150

0    ISSUE GROUP =   3   ISSUE =   6   REVOL FROM RPV (FRVOL)

     LEVEL 1 NO.<MED.=  1 NO. EXP.=  2     NO.>=MED.=  3 NO. EXP.=  2   TEST CANNOT BE RUN; EXP. NO. < 3
     LEVEL 2 NO.<MED.= 24 NO. EXP.= 23     NO.>=MED.= 23 NO. EXP.= 24   CHI-SQ.=   0.1 DF= 1 SIG.= 0.770
     LEVEL 3 NO.<MED.= 40 NO. EXP.= 38     NO.>=MED.= 36 NO. EXP.= 38   CHI-SQ.=   0.2 DF= 1 SIG.= 0.646
     LEVEL 4 NO.<MED.=  9 NO. EXP.= 11     NO.>=MED.= 14 NO. EXP.= 12   CHI-SQ.=   0.7 DF= 1 SIG.= 0.404
     OVERALL CHI-SQ=   1.0 DF=  5  SIG.= 0.963

0    ISSUE GROUP =   3   ISSUE =   7   CCI REL

     LEVEL 1 NO.<MED.= 12 NO. EXP.=  9     NO.>=MED.=  6 NO. EXP.=  9   CHI-SQ.=   2.0 DF= 1 SIG.= 0.157
     LEVEL 2 NO.<MED.= 31 NO. EXP.= 31     NO.>=MED.= 31 NO. EXP.= 31   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 3 NO.<MED.= 26 NO. EXP.= 27     NO.>=MED.= 29 NO. EXP.= 28   CHI-SQ.=   0.1 DF= 1 SIG.= 0.787
     LEVEL 4 NO.<MED.=  5 NO. EXP.=  7     NO.>=MED.= 10 NO. EXP.=  8   CHI-SQ.=   1.1 DF= 1 SIG.= 0.301
     OVERALL CHI-SQ=   3.1 DF=  7  SIG.= 0.871

0    ISSUE GROUP =   3   ISSUE =   8   RB DF

     LEVEL 1 NO.<MED.= 16 NO. EXP.= 12     NO.>=MED.=  9 NO. EXP.= 13   CHI-SQ.=   2.6 DF= 1 SIG.= 0.109
     LEVEL 2 NO.<MED.= 34 NO. EXP.= 29     NO.>=MED.= 24 NO. EXP.= 29   CHI-SQ.=   1.7 DF= 1 SIG.= 0.189
     LEVEL 3 NO.<MED.= 19 NO. EXP.= 26     NO.>=MED.= 33 NO. EXP.= 26   CHI-SQ.=   3.8 DF= 1 SIG.= 0.052
     LEVEL 4 NO.<MED.=  5 NO. EXP.=  7     NO.>=MED.= 10 NO. EXP.=  8   CHI-SQ.=   1.1 DF= 1 SIG.= 0.301
     OVERALL CHI-SQ=   9.1 DF=  7  SIG.= 0.244

0    ISSUE GROUP =   3   ISSUE =   9   REF BAY DF

     LEVEL 1 NO.<MED.=  6 NO. EXP.=  6     NO.>=MED.=  6 NO. EXP.=  6   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 2 NO.<MED.= 16 NO. EXP.= 13     NO.>=MED.= 11 NO. EXP.= 14   CHI-SQ.=   1.3 DF= 1 SIG.= 0.248
     LEVEL 3 NO.<MED.= 27 NO. EXP.= 28     NO.>=MED.= 30 NO. EXP.= 29   CHI-SQ.=   0.1 DF= 1 SIG.= 0.791
     LEVEL 4 NO.<MED.= 25 NO. EXP.= 27     NO.>=MED.= 29 NO. EXP.= 27   CHI-SQ.=   0.3 DF= 1 SIG.= 0.586
     OVERALL CHI-SQ=   1.7 DF=  7  SIG.= 0.974

0    ISSUE GROUP =   3   ISSUE =  10   LATE RELEASE FRACT, IODINE

     LEVEL 1 NO.<MED.=  4 NO. EXP.=  3     NO.>=MED.=  3 NO. EXP.=  4   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 2 NO.<MED.= 22 NO. EXP.= 24     NO.>=MED.= 27 NO. EXP.= 25   CHI-SQ.=   0.3 DF= 1 SIG.= 0.568
     LEVEL 3 NO.<MED.= 40 NO. EXP.= 36     NO.>=MED.= 33 NO. EXP.= 37   CHI-SQ.=   0.9 DF= 1 SIG.= 0.349
     LEVEL 4 NO.<MED.=  8 NO. EXP.= 10     NO.>=MED.= 13 NO. EXP.= 11   CHI-SQ.=   0.8 DF= 1 SIG.= 0.382
     OVERALL CHI-SQ=   2.0 DF=  7  SIG.= 0.962
```

```
1       CONSEQUENCE MEASURE:
        LATENT CANCERS


        BASE CASE :
         PEACH BOTTOM LLH (MACCS)

        ISSUE LEVELS FOR EACH SAMPLE MEMBER, IN ORDER OF INCREASING RISK
              RISK  ISSUE LEVELS, FOR ALL ISSUES
               1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
1.094E-04      2  2  2  1  1  2  3  3  4  1  6  3  2  2  2  1  2  1  2  2  2  2  2  2  2  2  4  3  3  2  2  2
2.238E-04      2  2  3  1  1  3  2  3  2  1  6  2  2  2  1  3  5  2  1  1  1  2  2  3  5  4  3  3  1  2  4  2
3.122E-04      2  1  2  2  1  4  1  3  3  1  3  3  1  2  2  2  2  2  2  1  2  2  1  2  2  3  4  3  2  1  4  3
3.195E-04      2  2  2  2  2  2  3  3  3  1  8  2  2  1  1  2  2  1  2  2  1  2  1  2  1  2  3  2  1  1  4  3
3.519E-04      3  2  2  1  3  3  3  2  3  1  5  3  2  2  2  1  2  3  2  2  2  2  2  1  4  2  4  3  2  2  4  1
4.683E-04      3  2  3  2  1  2  3  2  2  1  7  2  2  2  1  3  1  2  2  1  1  1  3  3  2  2  1  2  2  2  4  3
5.063E-04      3  2  3  2  3  2  4  3  1  1  8  3  1  2  2  3  4  2  2  2  1  2  2  2  4  2  2  2  2  2  1  2
6.490E-04      2  2  2  1  2  2  2  3  3  1  9  2  2  2  1  2  4  2  2  2  2  2  1  2  4  5  4  2  2  2  4  3
7.004E-04      2  2  2  2  2  2  2  2  3  1  6  2  2  1  1  1  1  1  2  2  1  2  2  3  2  4  2  3  3  2  1  3
7.412E-04      3  2  1  1  2  2  3  2  1  1  1  3  2  1  1  1  2  1  1  2  1  2  2  4  3  4  4  3  2  1  3  3
8.007E-04      3  3  3  1  1  1  2  2  3  1  4  3  2  1  2  2  2  2  2  1  2  2  3  1  2  2  2  3  1  2  4  3
8.047E-04      3  3  2  2  3  3  3  1  1  1  9  3  2  1  1  1  3  2  2  1  2  2  1  3  2  3  4  2  2  1  2  1
8.458E-04      4  2  3  2  2  3  3  1  2  2  7  2  2  2  1  2  1  2  2  2  1  2  2  3  3  3  2  3  3  1  4  3
9.340E-04      3  1  3  2  4  2  1  3  3  1  7  3  2  2  2  1  3  1  2  1  1  2  2  2  2  2  3  4  2  2  3  2
9.618E-04      3  3  2  1  1  2  3  3  2  1  6  2  2  1  2  2  2  2  2  2  2  2  2  4  3  2  4  4  1  1  1  2
9.789E-04      2  2  2  2  2  1  3  3  2  1  6  3  2  2  2  2  2  2  1  2  2  2  2  2  4  2  4  2  2  2  3  3
1.019E-03      2  2  3  2  3  4  2  3  3  1  6  2  2  1  2  4  1  2  2  2  1  1  2  4  2  2  3  2  1  2  3  2
1.051E-03      3  2  3  1  1  3  3  4  2  1  5  3  2  1  1  2  3  2  1  2  1  2  3  3  1  2  3  3  1  3  4  3
1.071E-03      3  3  1  1  1  2  3  4  3  1  6  2  2  2  2  2  1  2  2  2  2  2  2  3  4  2  3  2  3  2  2  3
1.151E-03      2  2  3  2  2  3  3  4  4  1  6  2  2  2  1  1  2  2  2  2  2  2  2  3  2  2  3  3  3  1  3  4
1.168E-03      2  2  2  1  2  4  3  3  2  1  8  2  2  2  2  3  2  1  2  2  1  2  3  1  3  2  4  4  3  1  3  4
1.170E-03      3  1  2  2  1  2  1  2  1  1  8  3  2  1  2  3  4  2  2  2  1  2  3  2  3  1  2  2  4  4  4  3
1.241E-03      2  2  2  1  4  2  2  3  2  1  7  3  2  1  2  1  1  2  2  2  1  2  2  3  4  2  3  3  3  2  4  4
1.429E-03      3  2  1  1  3  1  1  3  4  1  9  2  2  2  2  2  4  2  2  2  1  2  2  2  2  4  2  3  2  3  3  2
1.526E-03      2  3  1  1  3  3  3  4  3  2  5  2  2  1  2  3  3  2  1  2  2  2  3  2  4  2  3  3  2  1  3  2
1.538E-03      1  3  3  2  1  3  2  2  3  2  3  2  2  1  2  3  3  1  1  1  2  2  2  4  4  2  2  3  3  1  3  2
1.605E-03      3  3  2  1  2  2  2  3  2  1  6  2  2  1  2  2  1  1  2  1  2  2  1  2  2  2  3  3  2  3  3  2
1.685E-03      3  2  2  1  1  1  3  2  2  1  5  2  2  2  1  3  4  2  1  2  1  2  2  2  3  3  5  2  2  2  4  4
1.690E-03      2  1  3  2  2  4  3  2  2  1  7  2  2  1  2  1  3  1  1  1  2  1  3  1  2  4  1  2  2  2  4  3
1.707E-03      1  3  3  1  2  3  2  1  3  1  6  2  2  2  2  3  5  3  2  1  1  2  2  4  4  3  4  3  3  1  1  3
1.800E-03      1  2  2  1  2  2  3  3  3  1  5  2  2  2  1  2  4  1  2  1  2  1  4  4  1  5  3  3  3  2  1  2
1.884E-03      4  2  4  2  1  3  3  2  3  1  6  3  2  1  2  3  1  2  2  2  1  2  1  3  1  4  4  4  3  4  3  2
1.898E-03      1  3  2  1  3  3  4  2  3  1  3  3  2  1  2  2  2  3  2  2  2  2  2  1  2  2  3  2  1  3  3  2
2.007E-03      1  1  3  2  2  3  4  2  2  1  2  2  2  2  2  1  3  2  1  2  1  1  2  2  3  3  3  2  2  3  2  3
2.022E-03      1  1  3  1  2  3  4  2  2  1  3  3  2  1  2  2  2  1  1  2  1  2  2  1  2  2  2  2  3  3  3  3
2.035E-03      3  2  3  1  3  4  3  2  2  2  8  2  2  1  2  2  2  1  2  1  2  2  1  3  5  3  2  3  1  3  3  4
2.038E-03      2  3  3  1  3  2  2  3  4  2  8  2  2  1  2  3  2  1  2  1  1  2  2  2  2  4  4  2  2  2  4  2
2.059E-03      2  3  3  2  2  2  2  2  2  1  2  3  2  1  2  3  2  2  2  2  2  2  2  2  5  2  2  3  4  2  2  3
2.064E-03      3  1  2  1  2  3  1  4  2  1  2  2  2  1  1  2  3  2  2  1  2  1  2  1  2  2  3  2  2  2  2  4
2.080E-03      3  2  1  2  3  2  3  2  3  1  2  3  1  1  2  3  3  1  2  2  2  2  2  3  1  2  2  3  2  3  3  3
2.083E-03      2  1  3  2  2  1  2  3  4  1  5  2  2  2  1  2  2  3  1  2  2  2  2  3  1  2  3  3  4  2  4  2
2.166E-03      3  3  1  2  2  3  2  2  1  1  6  1  1  1  1  4  3  2  2  2  2  2  2  1  3  1  4  2  1  3  4  2
2.208E-03      4  3  3  1  3  2  3  1  3  2  6  3  2  2  2  3  3  1  2  2  2  2  1  1  3  2  2  2  3  2  2  2
2.233E-03      2  3  3  1  1  3  2  3  3  2  7  2  2  2  1  2  2  2  2  2  1  2  2  3  4  1  3  3  2  3  4  3
2.251E-03      2  2  2  1  2  3  1  3  3  1  3  2  2  2  1  3  2  2  2  2  1  2  1  3  3  2  2  2  3  4  3  3
2.371E-03      3  2  2  1  3  2  3  3  4  1  7  2  1  1  1  2  3  2  2  2  2  2  3  3  4  4  2  3  3  3  3  1
2.385E-03      3  2  3  1  2  2  3  3  4  1  6  2  2  2  1  4  4  2  2  1  2  2  3  3  3  2  3  2  3  2  3  4
2.393E-03      2  2  3  2  2  3  4  2  2  1  9  3  2  2  1  3  3  2  1  1  1  2  1  1  4  3  4  2  2  4  1  2
2.408E-03      3  3  4  2  2  3  2  3  2  1  7  2  1  1  1  2  1  2  2  1  1  2  2  4  3  2  2  1  2  3  2  3
2.421E-03      3  3  1  1  2  3  4  3  3  1  3  3  2  2  1  2  2  1  1  2  1  2  2  2  2  2  2  3  3  1  4  3
2.495E-03      2  2  4  1  4  2  3  3  3  1  6  2  2  2  1  3  2  2  2  2  1  2  1  1  2  2  2  3  2  1  4  3
2.509E-03      3  2  4  1  3  3  3  2  3  2  2  2  2  2  1  3  3  1  2  2  1  2  3  1  4  3  5  1  2  3  4  3
2.532E-03      1  2  2  2  2  2  3  2  2  1  4  3  2  2  1  3  2  2  1  2  1  2  2  1  3  1  2  3  4  3  4  2
2.615E-03      3  2  3  2  3  2  3  4  2  1  8  2  2  2  1  2  3  1  2  1  1  2  1  3  4  2  5  3  3  2  3  3
2.676E-03      3  2  2  1  2  4  2  3  3  1  8  3  2  1  2  2  1  1  1  2  2  2  3  1  4  3  4  3  3  2  3  3
2.703E-03      1  1  2  1  2  2  4  2  2  2  6  2  2  2  1  2  4  1  1  1  2  2  2  3  4  3  4  4  4  4  3  3
2.709E-03      3  2  3  2  2  2  3  2  1  1  5  3  2  2  1  2  2  2  2  2  1  1  2  2  4  4  4  3  2  1  4  3
2.775E-03      3  2  1  2  3  3  3  3  3  2  5  2  2  1  1  2  5  2  2  2  1  2  2  2  2  2  3  2  2  2  2  3
2.799E-03      3  1  2  1  2  3  2  2  2  2  5  2  2  1  2  2  3  2  2  1  2  2  3  2  2  4  3  3  3  3  3  4
2.824E-03      4  3  3  1  2  3  3  3  2  1  6  2  2  1  2  2  2  1  2  1  2  2  2  3  3  4  2  3  3  2  2  3
2.840E-03      4  3  3  2  2  3  3  1  2  1  4  2  1  1  2  2  5  1  2  2  1  2  3  2  2  2  4  2  3  1  4  3
3.003E-03      4  2  1  2  2  3  2  1  4  1  4  3  2  1  1  2  1  2  1  1  1  1  3  2  4  3  4  4  2  4  4  3
3.107E-03      3  2  2  1  3  3  3  4  2  1  6  2  2  1  2  3  1  2  1  1  1  2  3  3  3  1  5  3  3  1  3  4
3.135E-03      3  2  2  1  2  3  3  2  3  1  9  2  2  1  1  2  1  2  1  2  2  1  1  4  4  2  3  3  3  2  3  2
3.217E-03      2  2  3  1  3  3  2  1  3  1  5  2  2  2  2  2  3  1  1  2  2  2  1  3  1  2  5  3  1  2  3  1
3.218E-03      3  3  2  1  3  3  1  1  4  1  5  3  2  1  2  2  3  1  2  2  2  2  2  3  1  2  4  3  3  1  2  3
3.241E-03      2  1  2  2  3  3  2  1  2  2  6  2  2  1  1  2  3  1  2  2  2  2  2  2  3  1  4  2  3  3  3  1
3.243E-03      2  3  1  2  3  3  2  3  2  1  4  2  2  2  1  2  2  2  2  1  1  2  3  3  2  3  3  3  4  1  3  2
3.263E-03      2  3  2  2  3  2  2  2  2  1  4  1  2  2  2  1  3  2  2  1  1  2  2  1  4  2  2  3  2  2  3  4
3.350E-03      2  2  2  2  2  3  3  2  2  1  9  2  2  2  1  2  3  2  1  2  2  2  2  3  1  3  5  3  3  3  4  4
3.521E-03      2  3  2  1  2  4  3  2  3  2  6  2  2  1  1  2  1  1  2  1  2  2  1  3  4  1  4  4  2  2  3  2
3.675E-03      4  2  1  1  2  4  1  1  4  1  8  3  2  2  2  1  3  2  1  1  1  2  2  2  4  2  4  3  1  3  2  3
3.769E-03      3  3  2  1  2  1  2  3  3  1  2  2  2  2  2  2  3  2  2  1  1  2  1  2  3  3  1  3  2  4  4  3
4.262E-03      1  3  2  1  2  2  2  3  2  1  8  2  2  1  1  2  2  1  2  2  1  2  3  2  3  2  3  3  2  3  1  2
4.349E-03      3  2  2  2  2  3  2  3  4  1  2  2  2  1  1  3  5  2  2  1  1  1  2  3  3  3  5  4  3  3  4  2
4.413E-03      2  3  2  1  2  1  2  3  1  1  5  3  2  2  1  2  1  1  2  2  1  2  2  1  2  5  2  4  1  2  2  2
```

781

BEST COPY AVAILABLE

```
4.693E-03  1 2 2 2 4 4 1 2 2 1 2 2 2 1 2 2 1 1 2 2 2 1 1 2 5 5 4 1 3 2 3 2
4.716E-03  3 2 2 1 3 1 2 2 2 1 9 2 2 2 1 3 1 3 2 1 2 2 2 3 2 3 3 4 2 3 4 3
4.856E-03  1 3 3 2 3 2 3 3 4 1 7 3 2 2 2 2 2 2 1 1 2 2 3 2 3 2 4 2 2 2 2 2
5.038E-03  2 1 4 1 3 2 3 1 3 1 6 2 2 2 2 2 2 3 1 2 2 2 2 3 2 2 3 3 1 3 2 3
5.260E-03  3 2 3 1 3 2 2 2 2 1 3 2 2 2 2 3 3 2 2 2 1 2 2 3 4 2 1 4 3 3 3 3
5.288E-03  1 2 2 2 4 3 2 3 3 1 8 2 2 1 1 2 3 3 2 2 1 2 3 3 4 1 4 2 2 2 4 2
5.293E-03  2 2 2 1 3 4 3 2 2 1 6 3 2 2 2 3 5 2 1 1 2 2 1 4 2 2 2 3 2 2 4 3
5.607E-03  3 2 3 1 2 3 1 2 2 2 2 2 2 2 1 2 2 2 1 2 1 1 3 2 2 1 3 2 3 3 2 2
5.736E-03  2 1 4 1 4 2 3 2 2 1 4 3 2 2 2 2 3 1 2 1 1 2 2 4 3 2 4 4 2 3 4 3
5.736E-03  3 2 3 1 3 3 2 2 2 1 7 3 2 1 2 3 4 3 1 1 1 2 2 2 2 3 5 3 2 3 2 3
5.746E-03  2 3 3 1 3 3 2 1 1 1 7 2 2 1 1 2 2 2 2 2 2 2 2 2 1 1 3 3 3 2 3 3
5.854E-03  2 1 3 1 3 1 3 3 3 1 3 2 2 2 1 2 4 1 2 2 1 1 1 1 3 2 5 4 2 1 2 3
5.885E-03  3 2 3 1 3 3 4 4 3 1 7 2 2 2 1 3 2 1 1 1 1 2 4 3 2 3 2 3 3 3 4 2
6.007E-03  3 3 2 2 2 2 3 2 2 1 8 2 2 1 2 2 2 2 2 2 2 2 3 2 2 2 5 3 3 3 4 3
6.277E-03  2 3 3 1 4 2 2 3 3 1 6 2 2 2 1 2 4 2 1 1 1 2 3 3 3 4 3 2 1 2 4 3
6.460E-03  4 2 2 1 3 2 3 2 3 1 3 2 2 1 1 3 2 1 2 2 2 1 2 3 4 1 4 2 3 1 4 3
7.235E-03  2 2 2 2 3 1 1 3 1 1 2 2 2 1 1 3 3 1 1 2 2 2 1 2 3 2 2 3 2 4 4 2
7.558E-03  1 2 3 1 3 2 3 2 2 1 6 2 2 1 1 2 1 2 1 1 2 2 4 3 2 1 4 4 3 4 1 2
7.720E-03  2 2 1 1 3 2 2 4 1 1 6 2 2 2 2 3 3 1 1 1 2 2 2 3 2 2 2 3 4 3 3 3
7.976E-03  2 2 3 2 3 1 2 2 3 1 8 2 2 1 1 2 4 1 1 1 2 1 2 1 2 2 4 4 3 1 3 3
8.458E-03  3 2 3 1 3 2 2 3 1 1 5 2 2 2 2 3 1 2 1 1 2 1 1 2 2 3 5 1 2 1 1 4
8.525E-03  4 2 1 2 3 4 4 2 2 1 6 2 2 2 2 2 4 1 1 2 2 1 3 3 2 2 3 2 3 2 3 3
8.660E-03  3 2 3 2 3 2 2 3 3 1 3 2 2 1 2 2 1 3 1 1 2 2 1 3 3 3 4 4 4 3 4 2
8.731E-03  3 2 3 1 4 1 3 3 2 1 6 2 2 1 1 2 4 2 1 1 2 2 3 3 5 4 2 3 2 3 3 3
9.442E-03  2 3 4 2 3 2 2 2 3 1 5 2 1 2 2 2 2 1 1 1 1 2 3 1 2 2 3 3 2 2 2 3
9.445E-03  3 1 4 1 3 3 2 4 3 1 8 3 2 1 1 3 5 1 1 2 2 1 2 1 2 3 3 4 3 2 1 1
9.477E-03  2 3 4 2 3 3 3 2 3 2 3 2 2 2 2 2 1 1 1 2 2 2 2 3 5 1 4 3 1 3 3 2
9.890E-03  2 3 1 1 3 2 3 3 3 1 7 3 2 2 1 3 2 1 2 2 2 1 2 2 2 2 4 3 2 3 3 2
1.013E-02  4 2 2 2 3 2 4 2 3 1 3 2 2 2 1 2 1 2 1 2 2 2 2 3 4 2 2 4 2 4 3 4
1.016E-02  2 3 3 2 3 3 2 3 2 1 1 2 2 1 1 3 2 2 2 2 2 2 3 2 4 4 4 2 2 3 1 3
1.274E-02  3 3 3 2 2 3 3 3 2 1 6 2 1 2 1 2 4 3 2 1 1 1 2 3 3 4 3 4 2 1 4 2
1.339E-02  2 3 3 2 2 3 2 2 4 2 9 2 2 1 1 3 2 2 1 1 2 2 2 1 1 2 3 4 2 2 3 3
1.356E-02  2 3 2 1 2 2 3 2 4 1 7 2 2 1 2 3 3 1 1 2 1 2 1 2 3 1 1 3 2 2 2 3
1.375E-02  2 3 4 2 2 3 1 2 3 1 6 3 2 2 2 2 2 1 1 2 1 2 2 4 2 2 3 2 4 2 4 2
1.376E-02  2 3 2 1 2 2 1 3 1 1 4 2 2 1 2 2 3 2 1 2 2 2 1 2 1 2 2 2 2 2 4 3
1.409E-02  3 3 4 2 2 1 2 3 3 1 4 2 2 2 2 3 5 2 1 2 2 2 2 3 2 2 4 3 2 2 4 4
1.421E-02  3 3 2 2 2 2 3 3 3 2 6 2 1 2 2 3 2 1 1 1 1 2 2 3 1 3 3 2 2 3 3 3
1.423E-02  4 3 3 1 2 3 2 3 2 1 3 2 2 1 1 2 4 1 1 1 2 2 3 4 2 1 4 2 3 2 2 2
1.583E-02  3 3 2 2 2 2 2 3 2 1 3 3 2 2 2 2 3 1 1 1 1 1 2 4 3 2 2 3 2 4 2 3
1.631E-02  2 3 2 1 2 3 2 1 3 1 5 2 1 1 1 3 5 2 1 2 1 2 1 2 2 5 2 3 3 2 2 3
1.904E-02  3 4 2 2 4 3 2 3 2 1 5 2 2 2 2 2 4 2 2 1 2 2 3 3 2 2 3 2 3 2 4 2
1.918E-02  3 3 3 2 2 2 2 2 1 1 9 3 2 2 2 3 3 1 1 2 2 1 3 2 2 3 4 3 3 3 4 3
1.932E-02  4 2 3 1 4 2 3 4 3 2 6 2 1 1 2 2 3 2 1 1 2 2 2 1 2 2 4 2 4 2 1 3
1.988E-02  1 3 1 1 2 3 2 2 3 1 5 1 2 2 2 2 2 1 1 1 1 1 1 2 2 2 4 4 3 1 3 2
1.989E-02  2 3 2 1 2 2 4 2 4 1 5 3 2 1 2 2 5 2 1 1 1 2 1 2 2 2 3 2 3 3 3 2
2.067E-02  2 3 2 1 3 2 3 3 1 2 5 2 1 2 2 2 2 2 1 2 2 2 2 1 4 3 3 3 3 2 4 2
2.068E-02  2 3 3 1 3 2 4 3 2 1 2 3 2 1 2 1 3 2 2 2 2 2 3 3 2 4 5 3 3 3 4 3
2.089E-02  2 3 2 1 2 3 3 3 2 1 8 1 2 1 2 2 4 3 1 1 1 2 1 3 3 2 4 3 4 3 4 3
2.168E-02  2 2 2 1 4 2 3 2 1 1 9 2 2 1 2 3 1 1 1 1 1 1 2 4 4 2 3 2 3 3 4 2
2.173E-02  3 3 4 1 3 2 1 4 3 2 7 2 1 1 1 1 2 1 1 2 2 1 3 4 3 4 3 3 1 3 4 3
2.174E-02  2 3 3 1 3 2 3 2 3 1 7 2 1 1 2 3 2 1 1 1 1 2 2 3 3 2 4 3 2 2 4 4
2.194E-02  4 3 3 2 3 3 2 4 3 2 3 3 2 1 2 3 2 2 1 1 1 1 3 2 4 4 2 3 2 3 3 3
2.202E-02  3 4 4 1 3 2 2 4 2 2 8 2 2 2 2 2 4 2 2 2 2 1 1 3 3 2 3 3 4 2 3 3
2.312E-02  3 3 2 1 3 2 2 2 2 1 7 3 2 1 1 3 1 3 1 2 1 2 3 1 3 4 4 4 2 3 3 1
2.349E-02  2 3 2 2 3 3 3 2 2 1 7 3 2 1 1 4 3 2 1 2 1 2 2 2 3 3 3 3 2 3 2 4
2.401E-02  2 4 3 1 4 2 2 2 3 2 7 3 2 2 1 2 1 2 2 1 2 2 3 2 1 3 2 2 4 1 2 3
2.437E-02  3 3 2 2 3 4 4 3 3 1 5 3 2 1 1 1 5 2 1 2 1 2 1 3 2 2 3 2 2 4 4 2
2.845E-02  2 3 2 1 3 2 2 2 3 1 7 2 2 2 1 2 1 3 1 2 1 2 3 3 2 4 4 2 3 4 2 2
2.861E-02  3 3 3 2 3 1 3 1 2 1 3 3 2 2 1 3 3 2 1 2 2 1 3 1 4 3 5 2 3 3 3 2
2.900E-02  3 3 3 1 3 3 2 2 2 1 6 2 2 2 1 1 5 1 1 2 1 2 2 1 2 4 4 3 3 3 2 4
3.406E-02  3 3 2 1 4 1 2 2 2 1 9 2 2 1 2 2 4 1 1 2 1 2 2 2 2 2 3 3 1 3 4 2
3.855E-02  2 3 4 1 4 4 3 3 3 1 3 3 2 2 2 3 1 1 1 1 2 2 1 2 4 4 3 2 3 2 4 3
3.864E-02  2 4 3 2 2 3 2 3 2 1 3 3 2 1 2 2 5 1 2 2 2 2 2 2 2 2 3 3 2 3 3 2
5.426E-02  2 4 2 1 3 3 2 3 3 1 6 3 2 1 1 2 4 1 2 2 1 2 2 1 5 2 3 2 3 2 3 3
7.488E-02  3 4 4 1 2 3 3 2 2 1 3 2 2 2 2 3 1 2 1 2 2 2 2 2 2 4 4 3 1 2 3 3
7.758E-02  3 4 3 1 2 2 2 2 3 1 6 3 2 2 2 3 5 1 1 2 1 2 2 2 4 2 5 3 2 2 3 4
1.099E-01  1 4 3 2 1 3 2 3 3 1 9 2 2 1 1 2 2 1 1 2 2 2 2 1 4 3 4 2 2 3 4 3
1.109E-01  2 4 3 1 3 4 2 3 2 1 6 2 2 2 1 3 3 1 2 2 2 2 3 3 2 2 2 3 2 4 3 3
1.343E-01  4 4 3 2 1 2 4 3 2 1 5 1 2 1 1 2 1 2 1 2 1 2 1 2 3 2 2 4 4 2 3 2
1.742E-01  3 4 3 1 4 3 3 1 3 2 6 2 2 1 1 2 4 1 2 2 1 1 2 2 2 3 4 3 2 4 4 4
1.872E-01  4 4 3 2 2 3 2 2 2 1 6 3 2 1 1 2 3 2 1 2 1 2 3 2 4 2 2 3 3 3 3 3
2.179E-01  3 4 2 2 3 2 2 3 2 1 3 3 2 2 1 2 5 3 2 1 2 2 3 2 2 2 4 3 2 3 3 4
2.476E-01  2 4 2 1 2 3 4 4 3 1 5 3 2 1 1 3 1 2 1 1 1 1 1 2 3 4 4 2 4 3 3 3
2.515E-01  2 4 3 1 3 4 1 2 3 1 6 2 2 2 1 3 2 3 1 2 1 2 1 2 2 2 5 3 3 2 3 4

      MEAN =     1.806E-02     VARIANCE =     1.771E-03

      PERCENTILES :
           5-TH =     6.490E-04  50-TH =     4.381E-03  95-TH =     1.099E-01
      LOGARITHMIC MIDPOINT (OF POINTS > 0.) =     5.245E-03
      NUMBER ABOVE MIDPOINT = 70
      NUMBER BELOW MIDPOINT = 80
      CHI-SQUARED(1) =     6.667E-01
      DO NOT REJECT NULL (p > .05)
```

```
CONSEQUENCE MEASURE:
 LATENT CANCERS


 BASE CASE :
  PEACH BOTTOM LLH (MACCS)

 FRACTIONAL CONTRIBUTION OF EACH SEQUENCE TO MEAN RISK
                    SEQUENCE                 CONTRIBUTION
                    TB                             0.1454
                    TBUX                           0.8218
                    TBU                            0.0076
                    TCSX                           0.0067
                    TCUX                           0.0018
                    TCSRX2                         0.0132
                    TCSRV23                        0.0035
```

```
CONSEQUENCE MEASURE:
 LATENT CANCERS


 BASE CASE :
  PEACH BOTTOM LLH (MACCS)

 FRACTIONAL CONTRIBUTION OF EACH NONZERO BIN TO MEAN RISK
                     BIN                     CONTRIBUTION
          AAACAAGEFABCCABBEDABBB                0.0001
          AAACAAGEFABCCABBEEABBB                0.0001
          AAACACGEFABCCABBEDABBB                0.0001
          AAACACGEFABCCABBEEABBB                0.0001
          AAACACGGDABCBABBECABBB                0.0002
          AAACACGGDABCBABBEDABBB                0.0003
          AAACACGGDABCBABBEEABBB                0.0003
          AAACACGGDABCBADBEDABBB                0.0002
          AAACACGGDABCBADBEEABBB                0.0003
          BAACAAGBDAACBBBBHHABBB                0.0001
          BAACAAGBDAACBDDBHHABBB                0.0001
          BAACAAGBDABCBBBBHHABBB                0.0003
          BAACAAGBDABCBDDBHHABBB                0.0001
          BAACAAGBFABCCBBBHHABBB                0.0001
          BAACACGBDAACBBBBHHABBB                0.0020
          BAACACGBDAACBDDBHHABBB                0.0013
          BAACACGBDABCBBBBHHABBB                0.0003
          BAACACGBDABCBDDBHHABBB                0.0002
          BAACACGBFAACCBBBHHABBB                0.0006
          BAACACGBFAACCDDBHHABBB                0.0001
          BAACACGBFABCCBBBHHABBB                0.0004
          BAACACGGDAACBABBDDABBB                0.0002
          BAACACGGDAACBADBDDABBB                0.0001
          BAACACGGDABCBABBDEABBB                0.0001
          BABBACGGDAACBABBEGABBB                0.0001
          BABBACGGDABCBABBEGABBB                0.0001
          BABBACGGDABCBADBEGABBB                0.0001
          BACBAAGCFABCCBBBHHABBB                0.0003
          CAACAABGDDACBABBAEABAB                0.0001
          CAACAABGFDACBCCBAEABAB                0.0001
          CAACACBGDDACBABBADABAB                0.0002
          CAACACBGDDACBABBAEABAB                0.0002
          CAACACBGDDACBCDBACABAB                0.0001
          CAACACBGDDACBCDBADABAB                0.0002
          CAACACBGDDACBCDBAEABAB                0.0004
          CAACACBGDDACBCDBAFABAB                0.0001
          CAACACBGFDACBCCBADABAB                0.0001
          CAACACBGFDACBCCBAEABAB                0.0001
          CAACACBGFDACBCDBADABAB                0.0002
          CAACACBGFDACBCDBAEABAB                0.0002
          CAACCCBGDDACBABBADABAB                0.0001
          CAACCCBGDDACBABBAEABAB                0.0001
          DAAAAAGBDABCBBBBHHABBB                0.0005
          DAAAAAGBDABCBDDBHHABBB                0.0001
          DAAAAAGBDDACBBBBHHABBB                0.0002
          DAAAAAGBDDACBDDBHHABBB                0.0004
          DAAAAAGBFABCCBBBHHABBB                0.0005
          DAAAAAGBFABCCDDBHHABBB                0.0001
          DAAAAAGBFDACCBBBHHABBB                0.0007
          DAAAAAGBFDACCDDBHHABBB                0.0002
          DAAAACGBDABCBBBBHHABBB                0.0004
          DAAAACGBDABCBDDBHHABBB                0.0001
```

186

DAAAACGBDDACBBBBHHABBB	0.0018
DAAAACGBDDACBDDBHHABBB	0.0014
DAAAACGBFABCCBBBHHABBB	0.0005
DAAAACGBFABCCDDBHHABBB	0.0001
DAAAACGBFDACCBBBHHABBB	0.0012
DAAAACGBFDACCDDBHHABBB	0.0005
DAAAACGGDDACBBBBADABAB	0.0001
DAAAACGGDDACBBBBAEABAB	0.0003
DAAAACGGDDACBDDBADABAB	0.0001
DAAAACGGDDACBDDBAEABAB	0.0002
DAAAACGGDDACBDDBAGABAB	0.0001
DAAACCGBDDACBBBBHHABBB	0.0003
DAAACCGBDDACBDDBHHABBB	0.0001
DAAACCGBFDACCBBBHHABBB	0.0001
DAAACCGBFDACCDDBHHABBB	0.0001
DABAAAGADABCBDDBHGABAB	0.0002
DABAAAGADDACBBBBHGABAB	0.0001
DABAAAGADDACBDDBHGABAB	0.0001
DABAACGADABCBBBBHGABAB	0.0008
DABAACGADABCBDDBHGABAB	0.0001
DABAACGADDACBBBBHGABAB	0.0015
DABAACGADDACBDDBHGABAB	0.0005
DACAAAGADABCCBBBHHABBB	0.0001
EBAACCFGFDBCBADBEHBBBB	0.0002
EBAACCGGDDBCBABBEGABBB	0.0006
EBAACCGGDDBCBABBEGBBBB	0.0003
EBAACCGGDDBCBABBEHABBB	0.0022
EBAACCGGDDBCBABBEHBBBB	0.0021
EBAACCGGDDBCBADBEHABBB	0.0012
EBAACCGGDDBCBADBEHBBBB	0.0010
EBACBBGEFCBCCABBFBBABA	0.0001
EBACBBGEFCBCCABBFCBABA	0.0004
EBACBBGEFCBCCABBFEABBA	0.0006
EBACBBGEFCBCCABBFFABBA	0.0001
EBACBBGGDCBCBABBFBBABA	0.0097
EBACBBGGDCBCBABBFCBABA	0.0012
EBACBBGGDCBCBABBFDABBA	0.0007
EBACBBGGDCBCBABBFEABBA	0.0009
EBACBBGGDCBCBABBFFABBA	0.0007
EBACBCGEFCBCCABBFBBABA	0.0001
EBACBCGEFCBCCABBFCBABA	0.0004
EBACBCGEFCBCCABBFEABBA	0.0002
EBACBCGEFCBCCABBFFABBA	0.0001
EBACBCGGDCBCBABBFBBABA	0.0056
EBACBCGGDCBCBABBFCBABA	0.0011
EBACBCGGDCBCBABBFDABBA	0.0010
EBACBCGGDCBCBABBFEABBA	0.0014
EBACBCGGDCBCBABBFFABBA	0.0007
EBACBCGGDCBCBABBFFBBBA	0.0008
EBACBCGGDCBCBADBFBBABA	0.0050
EBACBCGGDCBCBADBFEABBA	0.0005
EBACBCGGDCBCBADBFFABBA	0.0005
EBACCCDEEDBCCADBFBBABB	0.0002
EBACCCDGFDBCBABBFBBABB	0.0002
EBACCCDGFDBCBACBFBBABB	0.0001
EBACCCDGFDBCBADBFBBABB	0.0049
EBACCCFGFDBBBABBFBBABB	0.0005
EBACCCFGFDBBBACBFEABBB	0.0001
EBACCCFGFDBBBADBFCBABB	0.0010
EBACCCFGFDBBBADBFEABBB	0.0015
EBACCCFGFDBBBADBFFABBB	0.0001
EBACCCFGFDBCBABBFBBABB	0.0010
EBACCCFGFDBCBABBFCABBB	0.0001
EBACCCFGFDBCBABBFCBABB	0.0058
EBACCCFGFDBCBABBFEABBB	0.0148
EBACCCFGFDBCBABBFEBBBB	0.0005
EBACCCFGFDBCBABBFFABBB	0.0002
EBACCCFGFDBCBABBFGABBB	0.0001
EBACCCFGFDBCBACBFBBABB	0.0001
EBACCCFGFDBCBACBFCBABB	0.0016
EBACCCFGFDBCBACBFEABBB	0.0006
EBACCCFGFDBCBADBFBBABB	0.0008
EBACCCFGFDBCBADBFCABBB	0.0002
EBACCCFGFDBCBADBFCBABB	0.0206
EBACCCFGFDBCBADBFEABBB	0.0068
EBACCCFGFDBCBADBFEBBBB	0.0015
EBACCCFGFDBCBADBFFABBB	0.0005
EBACCCFGFDBCBADBFGABBB	0.0001
EBACCCGDFDBCBABBFABAAB	0.0001
EBACCCGDFDBCBABBFBBABB	0.0001
EBACCCGDFDBCCABBFBBABB	0.0001
EBACCCGEFDBBCABBFBBABB	0.0002
EBACCCGEFDBCCABBFBBABB	0.0005
EBACCCGEFDBCCABBFCABBB	0.0001
EBACCCGEFDBCCABBFCBABB	0.0003
EBACCCGEFDBCCABBFEABBB	0.0007

187

EBACCCGEFDBCCADBFCBABB	0.0083
EBACCCGEFDBCCADBFEBBBB	0.0011
EBACCCGFFDBCCABBFEABBB	0.0002
EBACCCGFFDBCCABBFEABBB	0.0001
EBACCCGGDDBBBABBFABABB	0.0010
EBACCCGGDDBBBABBFBBABB	0.0002
EBACCCGGDDBBBABBFEABBB	0.0022
EBACCCGGDDBBBABBFFABBB	0.0016
EBACCCGGDDBBBABBFGABBB	0.0002
EBACCCGGDDBBBADBFABABB	0.0014
EBACCCGGDDBBBADBFCBABB	0.0016
EBACCCGGDDBBBADBFEABBB	0.0004
EBACCCGGDDBBBADBFFBBBB	0.0002
EBACCCGGDDBCBABBFABABB	0.0857
EBACCCGGDDBCBABBFBABAB	0.0003
EBACCCGGDDBCBABBFBBABB	0.2352
EBACCCGGDDBCBABBFCBABB	0.0410
EBACCCGGDDBCBABBFCBBBB	0.0039
EBACCCGGDDBCBABBFDABBB	0.0159
EBACCCGGDDBCBABBFDBBBB	0.0011
EBACCCGGDDBCBABBFEABBB	0.0479
EBACCCGGDDBCBABBFEBBBB	0.0190
EBACCCGGDDBCBABBFFABBB	0.0417
EBACCCGGDDBCBABBFFBBBB	0.0080
EBACCCGGDDBCBABBFGABBB	0.0103
EBACCCGGDDBCBADBFABABB	0.0336
EBACCCGGDDBCBADBFBBABB	0.0657
EBACCCGGDDBCBADBFCBABB	0.0047
EBACCCGGDDBCBADBFEABBB	0.0160
EBACCCGGDDBCBADBFEBBBB	0.0008
EBACCCGGDDBCBADBFFABBB	0.0058
EBACCCGGDDBCBADBFFBBBB	0.0082
EBACCCGGDDBCBADBFGABBB	0.0001
EBACCCGGEDBBBABBFBBABB	0.0013
EBACCCGGEDBBBABBFEABBB	0.0001
EBACCCGGEDBBBABBFFBBBB	0.0002
EBACCCGGEDBBBADBFEABBB	0.0013
EBACCCGGEDBCBABBFBBABB	0.0027
EBACCCGGEDBCBABBFCABBB	0.0001
EBACCCGGEDBCBABBFCBABB	0.0161
EBACCCGGEDBCBABBFCBBBB	0.0028
EBACCCGGEDBCBABBFEABBB	0.0112
EBACCCGGEDBCBABBFEBBBB	0.0011
EBACCCGGEDBCBABBFFABBB	0.0003
EBACCCGGEDBCBABBFFBBBB	0.0003
EBACCCGGEDBCBABBFGABBB	0.0002
EBACCCGGEDBCBABBFGBBBB	0.0001
EBACCCGGEDBCBADBFCBABB	0.0144
EBACCCGGEDBCBADBFEABBB	0.0021
EBACCCGGEDBCBADBFEBBBB	0.0008
EBACCCGGEDBCBADBFFBBBB	0.0001
EBBBACGEFBBCCABBDGABBB	0.0006
EBBBACGEFBBCCABBEGABBB	0.0006
EBBBACGGDBBBBABBDGABBB	0.0001
EBBBACGGDBBBBABBEGABBB	0.0001
EBBBACGGDBBCBABBDGABBB	0.0009
EBBBACGGDBBCBABBEGABBB	0.0012
EBBBACGGDBBCBADBDGABBB	0.0006
EBBBACGGDBBCBADBEGABBB	0.0007
FCACBBGGDCBCBABBDBBABA	0.0001
FCACBBGGDCBCBABBDCBABA	0.0001
FCACBBGGDCBCBABBDEABBA	0.0001
FCACBBGGDCBCBABBEBBABA	0.0001
FCACBBGGDCBCBABBEEABBA	0.0002
FCACBCGGDCBCBABBDBBABA	0.0001
FCACBCGGDCBCBABBDCBABA	0.0001
FCACBCGGDCBCBABBDEABBA	0.0002
FCACBCGGDCBCBABBEBBABA	0.0001
FCACBCGGDCBCBABBEEABBA	0.0002
FCACBCGGDCBCBADBDCBABA	0.0002
FCACBCGGDCBCBADBDFABBA	0.0001
FCACBCGGDCBCBADBECBABA	0.0002
FCACBCGGDCBCBADBEEABBA	0.0001
FCACCCDEEDBCCADBEBBABB	0.0001
FCACCCDGFDBBBADBEBBABB	0.0001
FCACCCDGFDBCBACBEBBABB	0.0002
FCACCCDGFDBCBADBDBBABB	0.0009
FCACCCDGFDBCBADBDCBABB	0.0004
FCACCCDGFDBCBADBDEABBB	0.0004
FCACCCDGFDBCBADBEBBABB	0.0026
FCACCCDGFDBCBADBECBABB	0.0004
FCACCCFGFDBCBABBDEABBB	0.0002
FCACCCFGFDBCBABBDFABBB	0.0001
FCACCCFGFDBCBABBECBABB	0.0001
FCACCCFGFDBCBABBEEABBB	0.0005
FCACCCFGFDBCBABBGEABBB	0.0008

FCACCCFGFDBCBADBCFABBB	0.0001
FCACCCFGFDBCBADBDEBBBB	0.0001
FCACCCFGFDBCBADBDFABBB	0.0001
FCACCCFGFDBCBADBEBBABB	0.0002
FCACCCFGFDBCBADBECBABB	0.0001
FCACCCFGFDBCBADBEEABBB	0.0009
FCACCCFGFDBCBADBEFABBB	0.0001
FCACCCFGFDBCBADBEGABBB	0.0003
FCACCCFGFDBCBADBGBBABB	0.0001
FCACCCGBDDBCBABBHHABBB	0.0004
FCACCCGBDDBCBABBHHBABB	0.0001
FCACCCGBDDBCBDDBHHABBB	0.0010
FCACCCGBDDBCBDDBHHBABB	0.0006
FCACCCGBFDBCCDDBHHABBB	0.0001
FCACCCGBFDBCCDDBHHBABB	0.0001
FCACCCGDFDBCBABBEBBABB	0.0001
FCACCCGDFDBCBADBDCBABB	0.0004
FCACCCGEFDBCBABBEEABBB	0.0002
FCACCCGEFDBCBADBEGABBB	0.0006
FCACCCGGDDBBBABBECBABB	0.0002
FCACCCGGDDBBBABBEEABBB	0.0029
FCACCCGGDDBBBADBGCBABB	0.0006
FCACCCGGDDBCBABBCABABB	0.0001
FCACCCGGDDBCBABBCBBABB	0.0022
FCACCCGGDDBCBABBDABABB	0.0015
FCACCCGGDDBCBABBDBBABB	0.0077
FCACCCGGDDBCBABBDCABBB	0.0001
FCACCCGGDDBCBABBDCBABB	0.0042
FCACCCGGDDBCBABBDDABBB	0.0034
FCACCCGGDDBCBABBDEABBB	0.0046
FCACCCGGDDBCBABBDEBBBB	0.0003
FCACCCGGDDBCBABBDFABBB	0.0028
FCACCCGGDDBCBABBDFBBBB	0.0002
FCACCCGGDDBCBABBDGABBB	0.0060
FCACCCGGDDBCBABBEABABB	0.0031
FCACCCGGDDBCBABBEBBABB	0.0108
FCACCCGGDDBCBABBECBABB	0.0028
FCACCCGGDDBCBABBEDABBB	0.0013
FCACCCGGDDBCBABBEEABBB	0.0160
FCACCCGGDDBCBABBEEBBBB	0.0005
FCACCCGGDDBCBABBEFABBB	0.0018
FCACCCGGDDBCBABBEFBBBB	0.0004
FCACCCGGDDBCBABBEGABBB	0.0012
FCACCCGGDDBCBABBGABABB	0.0002
FCACCCGGDDBCBABBGBBABB	0.0018
FCACCCGGDDBCBABBGCBABB	0.0023
FCACCCGGDDBCBABBGEABBB	0.0002
FCACCCGGDDBCBACB[illegible]BABB	0.0001
FCACCCGGDDBCBADBDABABB	0.0013
FCACCCGGDDBCBADBDBBABB	0.0022
FCACCCGGDDBCBADBDCBABB	0.0030
FCACCCGGDDBCBADBDEABBB	0.0023
FCACCCGGDDBCBADBDEBBBB	0.0002
FCACCCGGDDBCBADBDFABBB	0.0017
FCACCCGGDDBCBADBDGABBB	0.0064
FCACCCGGDDBCBADBEABABB	0.0022
FCACCCGGDDBCBADBEBBABB	0.0013
FCACCCGGDDBCBADBECBABB	0.0069
FCACCCGGDDBCBADBEEABBB	0.0027
FCACCCGGDDBCBADBEEBBBB	0.0003
FCACCCGGDDBCBADBEFABBB	0.0006
FCACCCGGDDBCBADBEFBBBB	0.0001
FCACCCGGDDBCBADBGCBABB	0.0010
FCACCCGGDDBCBADBGEABBB	0.0009
FCACCCGGDDBCBDDBHABABB	0.0001
FCACCCGGEDBBBABBDEABBB	0.0001
FCACCCGGEDBCBABBDEABBB	0.0004
FCACCCGGEDBCBABBEBBABB	0.0003
FCACCCGGEDBCBABBECBABB	0.0001
FCACCCGGEDBCBABBEEABBB	0.0020
FCACCCGGEDBCBABBGEABBB	0.0010
FCACCCGGEDBCBABBGFABBB	0.0001
FCACCCGGEDBCBADBCFABBB	0.0002
FCACCCGGEDBCBADBDCBABB	0.0002
FCACCCGGEDBCBADBEGABBB	0.0001
FCBBAAGCDBBBBBBBHHABBB	0.0003
FCBBAAGCDBBBBDDBHHABBB	0.0001
FCBBAAGCDBBCBBBBHHABBB	0.0005
FCBBAAGCDBBCBDDBHHABBB	0.0001
FCBBAAGCFBBBCBBBHHABBB	0.0002
FCBBAAGCFBBBCDDBHHABBB	0.0001
FCBBAAGCFBBCCBBBHHABBB	0.0004
FCBBAAGCFBBCCDDBHHABBB	0.0002
FCBBACGCDBBBBBBBHHABBB	0.0003
FCBBACGCDBBBBDDBHHABBB	0.0001
FCBBACGCDBBCBBBBHHABBB	0.0006

FCBBACGCDBBCBBBBHHBBBB	0.0001
FCBBACGCDBBCBDDBHHABBB	0.0003
FCBBACGCFBBBCBBBHHABBB	0.0002
FCBBACGCFBBBCDDBHHABBB	0.0001
FCBBACGCFBBCCBBBHHABBB	0.0005
FCBBACGCFBBCCBBBHHBBBB	0.0001
FCBBACGCFBBCCDDBHHABBB	0.0003
FCBBACGCFBBCCDDBHHBBBB	0.0001
FCBBACGEFBBCCABBEGABBB	0.0004
FCBBACGEFBBCCABBEGBBBB	0.0001
FCBBACGEFBBCCADBEGABBB	0.0001
FCBBACGGDBBBBABBEGABBB	0.0001
FCBBACGGDBBCBABBEGABBB	0.0005
FCBBACGGDBBCBABBEGBBBB	0.0001
FCBBACGGDBBCBADBEGABBB	0.0003
FCCBAAGCFBBACBBBHHABBB	0.0001
FCCBAAGCFBBACDDBHHABBB	0.0001
FCCBAAGCFBBBCBBBHHABBB	0.0011
FCCBAAGCFBBBCDDBHHABBB	0.0003
FCCBAAGCFBBCCBBBHHABBB	0.0034
FCCBAAGCFBBCCDDBHHABBB	0.0013

190

```
CONSEQUENCE MEASURE:
 LATENT CANCERS


 BASE CASE :
  PEACH BOTTOM LLH (MACCS)

FRACTIONAL CONTRIBUTIONS OF EACH RELEASE TO MEAN RISK
                 RELEASE            CONTRIBUTION
                 PCH  1D               0.0000
                 PCH  2D               0.0005
                 PCH  3D               0.0209
                 PCH  4D               0.0211
                 PCH  5D               0.0496
                 PCH  6D               0.1266
                 PCH  7D               0.2696
                 PCH  8D               0.3173
                 PCH  9D               0.1697
                 PCH 10D               0.0000
                 PCH 11D               0.0000
                 PCH 12D               0.0001
                 PCH 13D               0.0000
                 PCH 14D               0.0000
                 PCH 15D               0.0005
                 PCH 16D               0.0000
                 PCH 17D               0.0000
                 PCH 18D               0.0000
                 PCH 19D               0.0002
                 PCH 20D               0.0003
                 PCH 21D               0.0007
                 PCH 22D               0.0014
                 PCH 23D               0.0007
                 PCH 24D               0.0018
                 PCH 25D               0.0000
                 PCH 26D               0.0007
                 PCH 27D               0.0006
                 PCH 28D               0.0032
                 PCH 29D               0.0009
                 PCH 30D               0.0010
                 PCH 31D               0.0012
                 PCH 32D               0.0002
                 PCH 33D               0.0009
                 PCH 34D               0.0020
                 PCH 35D               0.0000
                 PCH 36D               0.0016
                 PCH 37D               0.0004
                 PCH 38D               0.0003
                 PCH 39D               0.0008
                 PCH 40D               0.0000
                 PCH 41D               0.0019
                 PCH 42D               0.0006
                 PCH 43D               0.0003
                 PCH 44D               0.0001
                 PCH 45D               0.0004
                 PCH 46D               0.0004
                 PCH 47D               0.0006
                 PCH 48D               0.0003
                 PCH 49D               0.0000
                 PCH 50D               0.0004
                 PCH 51D               0.0001
                 PCH 52D               0.0001
                 PCH 53D               0.0000
                 PCH 54D               0.0000
```

```
CONSEQUENCE MEASURE:
 LATENT CANCERS

 SENSITIVITY OF RISK TO ISSUES
 DISTRIBUTION OF RISK AT EACH LEVEL OF EACH ISSUE
 BASE CASE :
  PEACH BOTTOM LLH (MACCS)

GP ISS LVL NUM       5%          50%          MEAN         95%         R**2     F   DF       SIGNIF.
 1   1   1  15  0.1579E-02  0.2703E-02  0.1151E-01  0.7169E-01   0.02     0.9(  3,146)   0.47NS
         3  60  0.6126E-03  0.3176E-02  0.1594E-01  0.7622E-01
         2  60  0.3158E-03  0.5741E-02  0.1934E-01  0.7757E-01
         4  15  0.1033E-02  0.6460E-02  0.2795E-01  0.1723E+00
 1   2   1  15  0.4106E-03  0.2083E-02  0.3140E-02  0.8380E-02   0.38    29.7(  3,146)   0.00**
         2  60  0.3353E-03  0.2645E-02  0.3982E-02  0.9406E-02
         3  60  0.1015E-02  0.9460E-02  0.1131E-01  0.2880E-01
         4  15  0.1975E-01  0.1099E+00  0.1163E+00  0.2505E+00
 1   3   1  15  0.8127E-03  0.2775E-02  0.4677E-02  0.1670E-01   0.04     1.8(  3,146)   0.15NS
         4  15  0.2003E-02  0.9445E-02  0.1556E-01  0.6343E-01
         2  60  0.3353E-03  0.3643E-02  0.1586E-01  0.4299E-01
         3  60  0.6367E-03  0.5671E-02  0.2422E-01  0.1529E+00
 1   4   2  62  0.4908E-03  0.3306E-02  0.1717E-01  0.1191E+00   0.00     0.5(  1,148)   0.48NS
         1  88  0.7314E-03  0.4874E-02  0.1868E-01  0.8040E-01
 1   5   2  60  0.7205E-03  0.2920E-02  0.1582E-01  0.7622E-01   0.14     8.0(  3,146)   0.00**
         1  15  0.1308E-03  0.1071E-02  0.1718E-01  0.1277E+00
         3  60  0.9057E-03  0.6166E-02  0.1892E-01  0.7757E-01
         4  15  0.1003E-02  0.8731E-02  0.2441E-01  0.1195E+00
 2   1   1  15  0.8419E-03  0.4716E-02  0.8429E-02  0.3261E-01   0.00     0.0(  3,146)   1.00NS
         2  60  0.4870E-03  0.5493E-02  0.1495E-01  0.4698E-01
         3  60  0.8250E-03  0.3229E-02  0.2042E-01  0.1384E+00
         4  15  0.4196E-03  0.3675E-02  0.3066E-01  0.2049E+00
 2   2   3  60  0.4060E-03  0.2832E-02  0.1087E-01  0.3321E-01   0.04     1.9(  3,146)   0.13NS
         2  60  0.7489E-03  0.5741E-02  0.2063E-01  0.1104E+00
         1  15  0.4106E-03  0.3675E-02  0.2222E-01  0.1364E+00
         4  15  0.7045E-03  0.5885E-02  0.3235E-01  0.2125E+00
 2   3   1  15  0.8147E-03  0.3218E-02  0.1657E-01  0.1109E+00   0.00     0.2(  3,146)   0.87NS
         3  60  0.3158E-03  0.4305E-02  0.1721E-01  0.1104E+00
         2  60  0.7205E-03  0.5277E-02  0.1755E-01  0.7622E-01
         4  15  0.1056E-02  0.5885E-02  0.2455E-01  0.1352E+00
 2   4   4  15  0.1970E-03  0.3003E-02  0.5168E-02  0.1808E-01   0.02     0.7(  3,146)   0.52NS
         1  15  0.5569E-03  0.5746E-02  0.7798E-02  0.2142E-01
         2  60  0.9019E-03  0.4472E-02  0.1949E-01  0.1220E+00
         3  60  0.4779E-03  0.5564E-02  0.2242E-01  0.1384E+00
 2   5   2  24  0.1278E-02  0.3378E-02  0.1569E-01  0.4351E-01   0.00     0.2(  1,148)   0.66NS
         1 126  0.4985E-03  0.4551E-02  0.1851E-01  0.1101E+00
 2   6   2  11  0.2009E-02  0.3769E-02  0.5186E-02  0.1962E-01   0.04     0.6(  8,141)   0.74NS
         1   2************************  0.5452E-02************
         4   9  0.8007E-03  0.3243E-02  0.5475E-02  0.1409E-01
         8  16  0.3668E-03  0.3136E-02  0.5756E-02  0.2168E-01
         7  20  0.6294E-03  0.5741E-02  0.1002E-01  0.2614E-01
         9  12  0.6631E-03  0.3975E-02  0.1789E-01  0.9778E-01
         5  22  0.6786E-03  0.3768E-02  0.2489E-01  0.1712E+00
         3  20  0.6929E-03  0.9060E-02  0.2534E-01  0.1277E+00
         6  38  0.3532E-03  0.3378E-02  0.2710E-01  0.1819E+00
 2   7   2  94  0.7273E-03  0.4517E-02  0.1428E-01  0.6397E-01   0.01     0.8(  2,147)   0.44NS
         3  51  0.3584E-03  0.3675E-02  0.2325E-01  0.1791E+00
         1   5  0.2166E-02  0.1988E-01  0.3609E-01  0.1343E+00
 2   8   1  15  0.3523E-03  0.9442E-02  0.9923E-02  0.2173E-01   0.00     0.1(  1,148)   0.77NS
         2 135  0.7104E-03  0.4349E-02  0.1896E-01  0.1106E+00
 2   9   2  75  0.3780E-03  0.4413E-02  0.1660E-01  0.7689E-01   0.00     0.3(  1,148)   0.59NS
         1  75  0.8017E-03  0.4349E-02  0.1952E-01  0.1277E+00
 2  10   2  75  0.5678E-03  0.3769E-02  0.1014E-01  0.3739E-01   0.01     1.0(  1,148)   0.33NS
         1  75  0.6615E-03  0.4413E-02  0.2597E-01  0.1838E+00
 2  11   1  16  0.1553E-03  0.1448E-02  0.7028E-02  0.2753E-01   0.04     2.3(  3,146)   0.08NS
         4   4************************  0.7262E-02************
         2  80  0.8229E-03  0.4551E-02  0.1790E-01  0.1215E+00
         3  50  0.5063E-03  0.5810E-02  0.2270E-01  0.1109E+00
 2  12   2  45  0.3176E-03  0.2824E-02  0.1382E-01  0.3282E-01   0.04     1.6(  4,145)   0.17NS
         3  38  0.9793E-03  0.3252E-02  0.1416E-01  0.6449E-01
         4  22  0.5876E-03  0.7075E-02  0.1849E-01  0.8651E-01
         1  30  0.7004E-03  0.4551E-02  0.2258E-01  0.1343E+00
         5  15  0.3720E-03  0.1409E-01  0.3096E-01  0.1683E+00
 2  13   2  75  0.5387E-03  0.3135E-02  0.1488E-01  0.5887E-01   0.03     2.0(  2,147)   0.14NS
         1  60  0.7205E-03  0.5795E-02  0.1671E-01  0.9235E-01
         3  15  0.5223E-03  0.5736E-02  0.3934E-01  0.2426E+00
 2  14   2  75  0.3780E-03  0.2495E-02  0.1160E-01  0.4984E-01   0.18    31.7(  1,148)   0.00**
         1  75  0.1154E-02  0.9442E-02  0.2451E-01  0.1277E+00
 2  15   1  60  0.6124E-03  0.4785E-02  0.1540E-01  0.3043E-01   0.00     0.1(  1,148)   0.77NS
         2  90  0.6490E-03  0.3779E-02  0.1983E-01  0.1109E+00
 2  16   2  75  0.6840E-03  0.4856E-02  0.1421E-01  0.6346E-01   0.00     0.0(  1,148)   1.00NSR IMPOSSIBLE
         1  75  0.5491E-03  0.3769E-02  0.2191E-01  0.1632E+00
 2  17   2 120  0.5732E-03  0.3306E-02  0.1678E-01  0.9235E-01   0.02     3.3(  1,148)   0.07NS
         1  30  0.1019E-02  0.8213E-02  0.2315E-01  0.1742E+00
 3   1   4   3************************  0.5081E-02************   0.02     1.0(  3,146)   0.39NS
         2  74  0.5402E-03  0.3252E-02  0.1295E-01  0.7021E-01
         3  39  0.9051E-03  0.5607E-02  0.2151E-01  0.1479E+00
```

```
          1  34  0.3681E-03  0.4984E-02  0.2635E-01  0.2191E+00
 3    2   4  15  0.7911E-03  0.3135E-02  0.7437E-02  0.2172E-01    0.01    0.7(  3,146)    0.57NS
          3  51  0.8067E-03  0.4349E-02  0.9121E-02  0.2425E-01
          1  29  0.6767E-03  0.2676E-02  0.1263E-01  0.5621E-01
          2  55  0.3585E-03  0.5607E-02  0.3210E-01  0.2098E+00
 3    3   1  14  0.4054E-03  0.3218E-02  0.6437E-02  0.2162E-01    0.02    0.6(  4,145)    0.69NS
          5   7  0.2238E-03  0.4693E-02  0.1164E-01  0.5426E-01
          4  35  0.5387E-03  0.3003E-02  0.1685E-01  0.1008E+00
          3  36  0.8790E-03  0.4305E-02  0.1777E-01  0.7957E-01
          2  58  0.5501E-03  0.5946E-02  0.2254E-01  0.1454E+00
 3    4   5   5  0.6490E-03  0.4413E-02  0.5572E-02  0.1631E-01    0.01    0.3(  4,145)    0.88NS
          1  15  0.1365E-02  0.5288E-02  0.5727E-02  0.1406E-01
          3  30  0.8047E-03  0.4048E-02  0.1648E-01  0.1099E+00
          2  76  0.4794E-03  0.3957E-02  0.2022E-01  0.1268E+00
          4  24  0.4974E-03  0.7403E-02  0.2347E-01  0.1072E+00
 3    5   1   4************************  0.5246E-02************    0.02    0.7(  4,145)    0.56NS
          3  46  0.7536E-03  0.4874E-02  0.1061E-01  0.3857E-01
          2  35  0.7242E-03  0.2532E-02  0.1747E-01  0.1280E+00
          4  50  0.3519E-03  0.4773E-02  0.2325E-01  0.1742E+00
          5  15  0.1861E-02  0.5736E-02  0.2835E-01  0.1874E+00
 3    6   1   4************************  0.4517E-02************    0.00    0.2(  3,146)    0.89NS
          4  23  0.9520E-03  0.5736E-02  0.1268E-01  0.4280E-01
          2  47  0.5004E-03  0.3241E-02  0.1658E-01  0.6032E-01
          3  76  0.4326E-03  0.3509E-02  0.2131E-01  0.1521E+00
 3    7   1  18  0.2581E-03  0.2640E-02  0.9625E-02  0.5464E-01    0.03    1.6(  3,146)    0.19NS
          3  55  0.8972E-03  0.4349E-02  0.1679E-01  0.4981E-01
          2  62  0.4908E-03  0.4785E-02  0.1774E-01  0.1103E+00
          4  15  0.1348E-02  0.8660E-02  0.3413E-01  0.2125E+00
 3    8   1  25  0.3176E-03  0.2495E-02  0.4660E-02  0.2084E-01    0.09    4.7(  3,146)    0.00**
          2  58  0.3946E-03  0.3389E-02  0.1634E-01  0.7649E-01
          3  52  0.1632E-02  0.5810E-02  0.2401E-01  0.1775E+00
          4  15  0.1318E-02  0.7235E-02  0.2639E-01  0.1556E+00
 3    9   1  12  0.5230E-03  0.3193E-02  0.5606E-02  0.1812E-01    0.02    0.7(  3,146)    0.53NS
          2  27  0.5965E-03  0.4856E-02  0.8557E-02  0.2854E-01
          4  54  0.3257E-03  0.4529E-02  0.1318E-01  0.3761E-01
          3  57  0.9929E-03  0.3521E-02  0.2980E-01  0.2066E+00
 3   10   1   7  0.3519E-03  0.3217E-02  0.6079E-02  0.2312E-01    0.01    0.6(  3,146)    0.64NS
          2  49  0.4861E-03  0.4413E-02  0.1125E-01  0.3428E-01
          3  73  0.6565E-03  0.5038E-02  0.1730E-01  0.1038E+00
          4  21  0.1160E-02  0.3350E-02  0.4058E-01  0.2324E+00
 3   11   1  75  0.7557E-03  0.4856E-02  0.1497E-01  0.3591E-01    0.00    0.1(  1,148)    0.81NS
          2  75  0.3780E-03  0.4262E-02  0.2114E-01  0.1280E+00
 3   12   2  50  0.3519E-03  0.3496E-02  0.8164E-02  0.2437E-01    0.03    1.9(  2,147)    0.16NS
          3  50  0.8047E-03  0.3942E-02  0.1867E-01  0.1099E+00
          1  50  0.1151E-02  0.5736E-02  0.2734E-01  0.1872E+00
 3   13   4  37  0.5392E-03  0.4855E-02  0.1009E-01  0.3697E-01    0.02    0.8(  3,146)    0.49NS
          1  38  0.4183E-03  0.3252E-02  0.1093E-01  0.4751E-01
          3  38  0.8642E-03  0.4078E-02  0.2544E-01  0.1819E+00
          2  37  0.3997E-C3  0.5607E-02  0.2576E-01  0.1863E+00
 3   14   3  30  0.3519E-03  0.4108E-02  0.1095E-01  0.2900E-01    0.00    0.1(  4,145)    0.99NS
          4  30  0.9618E-03  0.5290E-02  0.1345E-01  0.3864E-01
          2  30  0.7412E-03  0.3597E-02  0.2075E-01  0.1742E+00
          5  30  0.2238E-03  0.2963E-02  0.2089E-01  0.1343E+00
          1  30  0.5063E-03  0.5278E-02  0.2425E-01  0.2476E+00
 4    1   6  19  0.4548E-03  0.2509E-02  0.7050E-02  0.3137E-01    0.06    1.4(  7,142)    0.21NS
          3  19  0.1060E-02  0.5736E-02  0.8296E-02  0.2483E-01
          4  19  0.6810E-03  0.7558E-02  0.1215E-01  0.3595E-01
          1  19  0.4851E-03  0.2495E-02  0.1486E-01  0.7774E-01
          2  18  0.2557E-03  0.5059E-02  0.2068E-01  0.1091E+00
          5  19  0.1160E-02  0.8731E-02  0.2420E-01  0.1105E+00
          8  19  0.8229E-03  0.2709E-02  0.2771E-01  0.2183E+00
          7  18  0.2579E-03  0.5161E-02  0.3031E-01  0.1957E+00
NS=NOT SIGNIFICANT, *=SIGNIFICANT (P<.05), **=SIGNIFICANT (P<.01)
```

BEST COPY AVAILABLE

193

```
     CONSEQUENCE MEASURE:  LATENT CANCERS
0    ISSUE GROUP =   1   ISSUE =   1   SLC FAILURE TO ACTUATE

     LEVEL 1 NO.<MED.=  9 NO. EXP.=  7     NO.>=MED.=  6 NO. EXP.=  8   CHI-SQ.=   1.1 DF= 1 SIG.= 0.301
     LEVEL 2 NO.<MED.= 26 NO. EXP.= 30     NO.>=MED.= 34 NO. EXP.= 30   CHI-SQ.=   1.1 DF= 1 SIG.= 0.302
     LEVEL 3 NO.<MED.= 32 NO. EXP.= 30     NO.>=MED.= 28 NO. EXP.= 30   CHI-SQ.=   0.3 DF= 1 SIG.= 0.606
     LEVEL 4 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   2.4 DF=  7  SIG.= 0.934

0    ISSUE GROUP =   1   ISSUE =   2   DC COMMON MODE

     LEVEL 1 NO.<MED.= 11 NO. EXP.=  7     NO.>=MED.=  4 NO. EXP.=  8   CHI-SQ.=   4.3 DF= 1 SIG.= 0.038
     LEVEL 2 NO.<MED.= 39 NO. EXP.= 30     NO.>=MED.= 21 NO. EXP.= 30   CHI-SQ.=   5.4 DF= 1 SIG.= 0.020
     LEVEL 3 NO.<MED.= 24 NO. EXP.= 30     NO.>=MED.= 36 NO. EXP.= 30   CHI-SQ.=   2.4 DF= 1 SIG.= 0.121
     LEVEL 4 NO.<MED.=  0 NO. EXP.=  7     NO.>=MED.= 15 NO. EXP.=  8   CHI-SQ.=  13.1 DF= 1 SIG.= 0.000
     OVERALL CHI-SQ=  25.2 DF=  7  SIG.= 0.001

0    ISSUE GROUP =   1   ISSUE =   3   FAILURE TO VENT

     LEVEL 1 NO.<MED.= 11 NO. EXP.=  7     NO.>=MED.=  4 NO. EXP.=  8   CHI-SQ.=   4.3 DF= 1 SIG.= 0.038
     LEVEL 2 NO.<MED.= 32 NO. EXP.= 30     NO.>=MED.= 28 NO. EXP.= 30   CHI-SQ.=   0.3 DF= 1 SIG.= 0.606
     LEVEL 3 NO.<MED.= 27 NO. EXP.= 30     NO.>=MED.= 33 NO. EXP.= 30   CHI-SQ.=   0.6 DF= 1 SIG.= 0.439
     LEVEL 4 NO.<MED.=  4 NO. EXP.=  7     NO.>=MED.= 11 NO. EXP.=  8   CHI-SQ.=   2.4 DF= 1 SIG.= 0.120
     OVERALL CHI-SQ=   7.6 DF=  7  SIG.= 0.373

0    ISSUE GROUP =   1   ISSUE =   4   SW MOD A VS. MOD B

     LEVEL 1 NO.<MED.= 42 NO. EXP.= 44     NO.>=MED.= 46 NO. EXP.= 44   CHI-SQ.=   0.2 DF= 1 SIG.= 0.670
     LEVEL 2 NO.<MED.= 32 NO. EXP.= 31     NO.>=MED.= 30 NO. EXP.= 31   CHI-SQ.=   0.1 DF= 1 SIG.= 0.799
     OVERALL CHI-SQ=   0.2 DF=  3  SIG.= 0.970

0    ISSUE GROUP =   1   ISSUE =   5   POWER RECOVERY

     LEVEL 1 NO.<MED.= 13 NO. EXP.=  7     NO.>=MED.=  2 NO. EXP.=  8   CHI-SQ.=   9.6 DF= 1 SIG.= 0.002
     LEVEL 2 NO.<MED.= 37 NO. EXP.= 30     NO.>=MED.= 23 NO. EXP.= 30   CHI-SQ.=   3.3 DF= 1 SIG.= 0.071
     LEVEL 3 NO.<MED.= 21 NO. EXP.= 30     NO.>=MED.= 39 NO. EXP.= 30   CHI-SQ.=   5.4 DF= 1 SIG.= 0.020
     LEVEL 4 NO.<MED.=  3 NO. EXP.=  7     NO.>=MED.= 12 NO. EXP.=  8   CHI-SQ.=   4.3 DF= 1 SIG.= 0.038
     OVERALL CHI-SQ=  22.6 DF=  7  SIG.= 0.002

0    ISSUE GROUP =   2   ISSUE =   1   PROB. OF STUCK OPEN VAC. BRKR.

     LEVEL 1 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
     LEVEL 2 NO.<MED.= 27 NO. EXP.= 30     NO.>=MED.= 33 NO. EXP.= 30   CHI-SQ.=   0.6 DF= 1 SIG.= 0.439
     LEVEL 3 NO.<MED.= 33 NO. EXP.= 30     NO.>=MED.= 27 NO. EXP.= 30   CHI-SQ.=   0.6 DF= 1 SIG.= 0.439
     LEVEL 4 NO.<MED.=  8 NO. EXP.=  7     NO.>=MED.=  7 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
     OVERALL CHI-SQ=   1.7 DF=  7  SIG.= 0.973

0    ISSUE GROUP =   2   ISSUE =   2   HPSW-SPRAY

     LEVEL 1 NO.<MED.=  8 NO. EXP.=  7     NO.>=MED.=  7 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
     LEVEL 2 NO.<MED.= 24 NO. EXP.= 30     NO.>=MED.= 36 NO. EXP.= 30   CHI-SQ.=   2.4 DF= 1 SIG.= 0.121
     LEVEL 3 NO.<MED.= 35 NO. EXP.= 30     NO.>=MED.= 25 NO. EXP.= 30   CHI-SQ.=   1.7 DF= 1 SIG.= 0.197
     LEVEL 4 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   4.3 DF=  7  SIG.= 0.741

0    ISSUE GROUP =   2   ISSUE =   3   VENT-SBO-NACR

     LEVEL 1 NO.<MED.= 10 NO. EXP.=  7     NO.>=MED.=  5 NO. EXP.=  8   CHI-SQ.=   2.4 DF= 1 SIG.= 0.120
     LEVEL 2 NO.<MED.= 27 NO. EXP.= 30     NO.>=MED.= 33 NO. EXP.= 30   CHI-SQ.=   0.6 DF= 1 SIG.= 0.439
     LEVEL 3 NO.<MED.= 30 NO. EXP.= 30     NO.>=MED.= 30 NO. EXP.= 30   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 4 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   3.0 DF=  7  SIG.= 0.884

0    ISSUE GROUP =   2   ISSUE =   4   VENT-SBO-ACR

     LEVEL 1 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
     LEVEL 2 NO.<MED.= 30 NO. EXP.= 30     NO.>=MED.= 30 NO. EXP.= 30   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 3 NO.<MED.= 28 NO. EXP.= 30     NO.>=MED.= 32 NO. EXP.= 30   CHI-SQ.=   0.3 DF= 1 SIG.= 0.606
     LEVEL 4 NO.<MED.= 10 NO. EXP.=  7     NO.>=MED.=  5 NO. EXP.=  8   CHI-SQ.=   2.4 DF= 1 SIG.= 0.120
     OVERALL CHI-SQ=   2.9 DF=  7  SIG.= 0.890

0    ISSUE GROUP =   2   ISSUE =   5   SP BYPASS, SMALL/LARGE

     LEVEL 1 NO.<MED.= 61 NO. EXP.= 63     NO.>=MED.= 65 NO. EXP.= 63   CHI-SQ.=   0.1 DF= 1 SIG.= 0.722
     LEVEL 2 NO.<MED.= 13 NO. EXP.= 12     NO.>=MED.= 11 NO. EXP.= 12   CHI-SQ.=   0.2 DF= 1 SIG.= 0.683
     OVERALL CHI-SQ=   0.3 DF=  3  SIG.= 0.961

0    ISSUE GROUP =   2   ISSUE =   6   CONT FAILURE PRESS. (T<500F B VB)

     LEVEL 1 NO.<MED.=  1 NO. EXP.=  1     NO.>=MED.=  1 NO. EXP.=  1    TEST CANNOT BE RUN; EXP. NO. < 3
     LEVEL 2 NO.<MED.=  6 NO. EXP.=  5     NO.>=MED.=  5 NO. EXP.=  6   CHI-SQ.=   0.4 DF= 1 SIG.= 0.545
     LEVEL 3 NO.<MED.=  6 NO. EXP.= 10     NO.>=MED.= 14 NO. EXP.= 10   CHI-SQ.=   3.2 DF= 1 SIG.= 0.074
     LEVEL 4 NO.<MED.=  6 NO. EXP.=  4     NO.>=MED.=  3 NO. EXP.=  5   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 5 NO.<MED.= 11 NO. EXP.= 11     NO.>=MED.= 11 NO. EXP.= 11   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 6 NO.<MED.= 20 NO. EXP.= 19     NO.>=MED.= 18 NO. EXP.= 19   CHI-SQ.=   0.1 DF= 1 SIG.= 0.746
     LEVEL 7 NO.<MED.=  8 NO. EXP.= 10     NO.>=MED.= 12 NO. EXP.= 10   CHI-SQ.=   0.8 DF= 1 SIG.= 0.371
     LEVEL 8 NO.<MED.= 10 NO. EXP.=  8     NO.>=MED.=  6 NO. EXP.=  8   CHI-SQ.=   1.0 DF= 1 SIG.= 0.317
     LEVEL 9 NO.<MED.=  6 NO. EXP.=  6     NO.>=MED.=  6 NO. EXP.=  6   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   5.5 DF= 15  SIG.= 0.987

0    ISSUE GROUP =   2   ISSUE =   7   LATE FAILURE LOCATION (800-1200 A VB)

     LEVEL 1 NO.<MED.=  2 NO. EXP.=  2     NO.>=MED.=  3 NO. EXP.=  3    TEST CANNOT BE RUN; EXP. NO. < 3
     LEVEL 2 NO.<MED.= 46 NO. EXP.= 47     NO.>=MED.= 48 NO. EXP.= 47   CHI-SQ.=   0.0 DF= 1 SIG.= 0.837
     LEVEL 3 NO.<MED.= 26 NO. EXP.= 25     NO.>=MED.= 25 NO. EXP.= 25   CHI-SQ.=   0.1 DF= 1 SIG.= 0.779
     OVERALL CHI-SQ=   0.1 DF=  3  SIG.= 0.989

0    ISSUE GROUP =   2   ISSUE =   8   CONT FAILURE SIZE, RAPID PRESS.
```

```
    LEVEL 1 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
    LEVEL 2 NO.<MED.= 67 NO. EXP.= 67     NO.>=MED.= 68 NO. EXP.= 68   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
    OVERALL CHI-SQ=   0.0 DF=  3  SIG.= 1.000

0   ISSUE GROUP =   2   ISSUE =   9   CONT FAILURE SIZE, SLOW PRESS.

    LEVEL 1 NO.<MED.= 37 NO. EXP.= 37     NO.>=MED.= 38 NO. EXP.= 38   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
    LEVEL 2 NO.<MED.= 37 NO. EXP.= 37     NO.>=MED.= 38 NO. EXP.= 38   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
    OVERALL CHI-SQ=   0.0 DF=  3  SIG.= 1.000

0   ISSUE GROUP =   2   ISSUE =  10   VB MODE, HIGH-P FLOW MELT

    LEVEL 1 NO.<MED.= 36 NO. EXP.= 37     NO.>=MED.= 39 NO. EXP.= 38   CHI-SQ.=   0.1 DF= 1 SIG.= 0.817
    LEVEL 2 NO.<MED.= 38 NO. EXP.= 37     NO.>=MED.= 37 NO. EXP.= 38   CHI-SQ.=   0.1 DF= 1 SIG.= 0.817
    OVERALL CHI-SQ=   0.1 DF=  3  SIG.= 0.991

0   ISSUE GROUP =   2   ISSUE =  11   CONT PRESS. BEFORE VB, LONG TERM TB

    LEVEL 1 NO.<MED.= 12 NO. EXP.=  8     NO.>=MED.=  4 NO. EXP.=  8   CHI-SQ.=   4.0 DF= 1 SIG.= 0.046
    LEVEL 2 NO.<MED.= 39 NO. EXP.= 40     NO.>=MED.= 41 NO. EXP.= 40   CHI-SQ.=   0.1 DF= 1 SIG.= 0.823
    LEVEL 3 NO.<MED.= 20 NO. EXP.= 25     NO.>=MED.= 30 NO. EXP.= 25   CHI-SQ.=   2.0 DF= 1 SIG.= 0.157
    LEVEL 4 NO.<MED.=  3 NO. EXP.=  2     NO.>=MED.=  1 NO. EXP.=  2    TEST CANNOT BE RUN; EXP. NO. < 3
    OVERALL CHI-SQ=   6.1 DF=  5  SIG.= 0.301

0   ISSUE GROUP =   2   ISSUE =  12   PRESSURE RISE AT VB

    LEVEL 1 NO.<MED.= 14 NO. EXP.= 15     NO.>=MED.= 16 NO. EXP.= 15   CHI-SQ.=   0.1 DF= 1 SIG.= 0.715
    LEVEL 2 NO.<MED.= 25 NO. EXP.= 22     NO.>=MED.= 20 NO. EXP.= 23   CHI-SQ.=   0.8 DF= 1 SIG.= 0.371
    LEVEL 3 NO.<MED.= 23 NO. EXP.= 19     NO.>=MED.= 15 NO. EXP.= 19   CHI-SQ.=   1.7 DF= 1 SIG.= 0.194
    LEVEL 4 NO.<MED.=  8 NO. EXP.= 11     NO.>=MED.= 14 NO. EXP.= 11   CHI-SQ.=   1.6 DF= 1 SIG.= 0.201
    LEVEL 5 NO.<MED.=  4 NO. EXP.=  7     NO.>=MED.= 11 NO. EXP.=  8   CHI-SQ.=   2.4 DF= 1 SIG.= 0.120
    OVERALL CHI-SQ=   6.7 DF=  9  SIG.= 0.672

0   ISSUE GROUP =   2   ISSUE =  13   DELTA P DUE TO SUMP WATER INTERACT.

    LEVEL 1 NO.<MED.= 27 NO. EXP.= 30     NO.>=MED.= 33 NO. EXP.= 30   CHI-SQ.=   0.6 DF= 1 SIG.= 0.439
    LEVEL 2 NO.<MED.= 43 NO. EXP.= 37     NO.>=MED.= 32 NO. EXP.= 38   CHI-SQ.=   1.9 DF= 1 SIG.= 0.166
    LEVEL 3 NO.<MED.=  4 NO. EXP.=  7     NO.>=MED.= 11 NO. EXP.=  8   CHI-SQ.=   2.4 DF= 1 SIG.= 0.120
    OVERALL CHI-SQ=   4.9 DF=  5  SIG.= 0.424

0   ISSUE GROUP =   2   ISSUE =  14   PROB OF DRY DW MELT THROUGH

    LEVEL 1 NO.<MED.= 22 NO. EXP.= 37     NO.>=MED.= 53 NO. EXP.= 38   CHI-SQ.=  12.0 DF= 1 SIG.= 0.001
    LEVEL 2 NO.<MED.= 52 NO. EXP.= 37     NO.>=MED.= 23 NO. EXP.= 38   CHI-SQ.=  12.0 DF= 1 SIG.= 0.001
    OVERALL CHI-SQ=  24.0 DF=  3  SIG.= 0.000

0   ISSUE GROUP =   2   ISSUE =  15   PROB OF WET DW MELT THROUGH

    LEVEL 1 NO.<MED.= 28 NO. EXP.= 30     NO.>=MED.= 32 NO. EXP.= 30   CHI-SQ.=   0.3 DF= 1 SIG.= 0.606
    LEVEL 2 NO.<MED.= 46 NO. EXP.= 45     NO.>=MED.= 44 NO. EXP.= 45   CHI-SQ.=   0.0 DF= 1 SIG.= 0.833
```

196

```
     OVERALL CHI-SQ=   0.3 DF=  3  SIG.= 0.958

0    ISSUE GROUP =   2   ISSUE =  16   PROB OF DW M-THRU W/HI-P MELT EJECT

     LEVEL 1 NO.<MED.= 39 NO. EXP.= 37     NO.>=MED.= 36 NO. EXP.= 38   CHI-SQ.=   0.2 DF= 1 SIG.= 0.644
     LEVEL 2 NO.<MED.= 35 NO. EXP.= 37     NO.>=MED.= 40 NO. EXP.= 38   CHI-SQ.=   0.2 DF= 1 SIG.= 0.644
     OVERALL CHI-SQ=   0.4 DF=  3  SIG.= 0.935

0    ISSUE GROUP =   2   ISSUE =  17   PROB OF H2 BURNS IN RB LEADING TO BP

     LEVEL 1 NO.<MED.=  9 NO. EXP.= 15     NO.>=MED.= 21 NO. EXP.= 15   CHI-SQ.=   4.8 DF= 1 SIG.= 0.028
     LEVEL 2 NO.<MED.= 65 NO. EXP.= 60     NO.>=MED.= 55 NO. EXP.= 60   CHI-SQ.=   0.8 DF= 1 SIG.= 0.361
     OVERALL CHI-SQ=   5.6 DF=  3  SIG.= 0.131

0    ISSUE GROUP =   3   ISSUE =   1   IN-VES RELEASE FROM FUEL

     LEVEL 1 NO.<MED.= 16 NO. EXP.= 17     NO.>=MED.= 18 NO. EXP.= 17   CHI-SQ.=   0.1 DF= 1 SIG.= 0.732
     LEVEL 2 NO.<MED.= 40 NO. EXP.= 37     NO.>=MED.= 34 NO. EXP.= 37   CHI-SQ.=   0.5 DF= 1 SIG.= 0.486
     LEVEL 3 NO.<MED.= 17 NO. EXP.= 19     NO.>=MED.= 22 NO. EXP.= 20   CHI-SQ.=   0.4 DF= 1 SIG.= 0.522
     LEVEL 4 NO.<MED.=  1 NO. EXP.=  1     NO.>=MED.=  2 NO. EXP.=  2    TEST CANNOT BE RUN; EXP. NO. < 3
     OVERALL CHI-SQ=   1.0 DF=  5  SIG.= 0.961

0    ISSUE GROUP =   3   ISSUE =   2   CSI DECOMP

     LEVEL 1 NO.<MED.= 16 NO. EXP.= 14     NO.>=MED.= 13 NO. EXP.= 15   CHI-SQ.=   0.6 DF= 1 SIG.= 0.457
     LEVEL 2 NO.<MED.= 25 NO. EXP.= 27     NO.>=MED.= 30 NO. EXP.= 28   CHI-SQ.=   0.3 DF= 1 SIG.= 0.590
     LEVEL 3 NO.<MED.= 25 NO. EXP.= 25     NO.>=MED.= 26 NO. EXP.= 26   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 4 NO.<MED.=  8 NO. EXP.=  7     NO.>=MED.=  7 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
     OVERALL CHI-SQ=   1.1 DF=  7  SIG.= 0.993

0    ISSUE GROUP =   3   ISSUE =   3   FRAC IN-VES RETENTION LEAKED, AT VB

     LEVEL 1 NO.<MED.=  9 NO. EXP.=  7     NO.>=MED.=  5 NO. EXP.=  7   CHI-SQ.=   1.1 DF= 1 SIG.= 0.285
     LEVEL 2 NO.<MED.= 22 NO. EXP.= 29     NO.>=MED.= 36 NO. EXP.= 29   CHI-SQ.=   3.4 DF= 1 SIG.= 0.066
     LEVEL 3 NO.<MED.= 18 NO. EXP.= 18     NO.>=MED.= 18 NO. EXP.= 18   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 4 NO.<MED.= 22 NO. EXP.= 17     NO.>=MED.= 13 NO. EXP.= 18   CHI-SQ.=   2.9 DF= 1 SIG.= 0.091
     LEVEL 5 NO.<MED.=  3 NO. EXP.=  3     NO.>=MED.=  4 NO. EXP.=  4   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   7.4 DF=  9  SIG.= 0.597

0    ISSUE GROUP =   3   ISSUE =   4   S POOL DF

     LEVEL 1 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 2 NO.<MED.= 39 NO. EXP.= 38     NO.>=MED.= 37 NO. EXP.= 38   CHI-SQ.=   0.1 DF= 1 SIG.= 0.819
     LEVEL 3 NO.<MED.= 15 NO. EXP.= 15     NO.>=MED.= 15 NO. EXP.= 15   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 4 NO.<MED.= 11 NO. EXP.= 12     NO.>=MED.= 13 NO. EXP.= 12   CHI-SQ.=   0.2 DF= 1 SIG.= 0.683
     LEVEL 5 NO.<MED.=  2 NO. EXP.=  2     NO.>=MED.=  3 NO. EXP.=  3    TEST CANNOT BE RUN; EXP. NO. < 3
     OVERALL CHI-SQ=   0.2 DF=  7  SIG.= 1.000

0    ISSUE GROUP =   3   ISSUE =   5   S POOL DF, VOL I
```

```
     LEVEL 1 NO.<MED.=  2 NO. EXP.=  2     NO.>=MED.=  2 NO. EXP.=  2    TEST CANNOT BE RUN; EXP. NO. < 3
     LEVEL 2 NO.<MED.= 20 NO. EXP.= 17     NO.>=MED.= 15 NO. EXP.= 18   CHI-SQ.=   1.0 DF= 1 SIG.= 0.310
     LEVEL 3 NO.<MED.= 22 NO. EXP.= 23     NO.>=MED.= 24 NO. EXP.= 23   CHI-SQ.=   0.1 DF= 1 SIG.= 0.768
     LEVEL 4 NO.<MED.= 24 NO. EXP.= 25     NO.>=MED.= 26 NO. EXP.= 25   CHI-SQ.=   0.1 DF= 1 SIG.= 0.777
     LEVEL 5 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
     OVERALL CHI-SQ=   1.5 DF=  7  SIG.= 0.984

0    ISSUE GROUP =   3   ISSUE =   6   REVOL FROM RPV (FRVOL)

     LEVEL 1 NO.<MED.=  2 NO. EXP.=  2     NO.>=MED.=  2 NO. EXP.=  2    TEST CANNOT BE RUN; EXP. NO. < 3
     LEVEL 2 NO.<MED.= 24 NO. EXP.= 23     NO.>=MED.= 23 NO. EXP.= 24   CHI-SQ.=   0.1 DF= 1 SIG.= 0.770
     LEVEL 3 NO.<MED.= 41 NO. EXP.= 38     NO.>=MED.= 35 NO. EXP.= 38   CHI-SQ.=   0.5 DF= 1 SIG.= 0.491
     LEVEL 4 NO.<MED.=  7 NO. EXP.= 11     NO.>=MED.= 16 NO. EXP.= 12   CHI-SQ.=   2.8 DF= 1 SIG.= 0.095
     OVERALL CHI-SQ=   3.3 DF=  5  SIG.= 0.647

0    ISSUE GROUP =   3   ISSUE =   7   CCI REL

     LEVEL 1 NO.<MED.= 11 NO. EXP.=  9     NO.>=MED.=  7 NO. EXP.=  9   CHI-SQ.=   0.9 DF= 1 SIG.= 0.346
     LEVEL 2 NO.<MED.= 30 NO. EXP.= 31     NO.>=MED.= 32 NO. EXP.= 31   CHI-SQ.=   0.1 DF= 1 SIC.= 0.799
     LEVEL 3 NO.<MED.= 27 NO. EXP.= 27     NO.>=MED.= 28 NO. EXP.= 28   CHI-SQ.=   0.0 DF= 1 SIG.= 1.00
     LEVEL 4 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
     OVERALL CHI-SQ=   1.2 DF=  7  SIG.= 0.990

0    ISSUE GROUP =   3   ISSUE =   8   RB DF

     LEVEL 1 NO.<MED.= 18 NO. EXP.= 12     NO.>=MED.=  7 NO. EXP.= 13   CHI-SQ.=   5.8 DF= 1 SIG.= 0.016
     LEVEL 2 NO.<MED.= 30 NO. EXP.= 29     NO.>=MED.= 28 NO. EXP.= 29   CHI-SQ.=   0.1 DF= 1 SIG.= 0.793
     LEVEL 3 NO.<MED.= 19 NO. EXP.= 26     NO.>=MED.= 33 NO. EXP.= 26   CHI-SQ.=   3.8 DF= 1 SIG.= 0.052
     LEVEL 4 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   9.6 DF=  7  SIG.= 0.212

0    ISSUE GROUP =   3   ISSUE =   9   REF BAY DF

     LEVEL 1 NO.<MED.=  7 NO. EXP.=  6     NO.>=MED.=  5 NO. EXP.=  6   CHI-SQ.=   0.3 DF= 1 SIG.= 0.564
     LEVEL 2 NO.<MED.= 12 NO. EXP.= 13     NO.>=MED.= 15 NO. EXP.= 14   CHI-SQ.=   0.1 DF= 1 SIG.= 0.700
     LEVEL 3 NO.<MED.= 29 NO. EXP.= 28     NO.>=MED.= 28 NO. EXP.= 29   CHI-SQ.=   0.1 DF= 1 SIG.= 0.791
     LEVEL 4 NO.<MED.= 26 NO. EXP.= 27     NO.>=MED.= 28 NO. EXP.= 27   CHI-SQ.=   0.1 DF= 1 SIG.= 0.785
     OVERALL CHI-SQ=   0.6 DF=  7  SIG.= 0.999

0    ISSUE GROUP =   3   ISSUE =  10   LATE RELEASE FRACT, IODINE

     LEVEL 1 NO.<MED.=  5 NO. EXP.=  3     NO.>=MED.=  2 NO. EXP.=  4   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 2 NO.<MED.= 23 NO. EXP.= 24     NO.>=MED.= 26 NO. EXP.= 25   CHI-SQ.=   0.1 DF= 1 SIG.= 0.775
     LEVEL 3 NO.<MED.= 35 NO. EXP.= 36     NO.>=MED.= 38 NO. EXP.= 37   CHI-SQ.=   0.1 DF= 1 SIG.= 0.815
     LEVEL 4 NO.<MED.= 11 NO. EXP.= 10     NO.>=MED.= 10 NO. EXP.= 11   CHI-SQ.=   0.2 DF= 1 SIG.= 0.662
     OVERALL CHI-SQ=   0.3 DF=  7  SIG.= 1.000

0    ISSUE GROUP =   3   ISSUE =  11   DUMMY ISSUE
```

```
      LEVEL 1 NO.<MED.= 36 NO. EXP.= 37     NO.>=MED.= 39 NO. EXP.= 38   CHI-SQ.=   0.1 DF= 1 SIG.= 0.817
      LEVEL 2 NO.<MED.= 38 NO. EXP.= 37     NO.>=MED.= 37 NO. EXP.= 38   CHI-SQ.=   0.1 DF= 1 SIG.= 0.817
      OVERALL CHI-SQ=   0.1 DF=  3  SIG.= 0.991

0     ISSUE GROUP =   3   ISSUE =  12   DUMMY ISSUE

      LEVEL 1 NO.<MED.= 23 NO. EXP.= 25     NO.>=MED.= 27 NO. EXP.= 25   CHI-SQ.=   0.3 DF= 1 SIG.= 0.572
      LEVEL 2 NO.<MED.= 26 NO. EXP.= 25     NO.>=MED.= 24 NO. EXP.= 25   CHI-SQ.=   0.1 DF= 1 SIG.= 0.777
      LEVEL 3 NO.<MED.= 25 NO. EXP.= 25     NO.>=MED.= 25 NO. EXP.= 25   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
      OVERALL CHI-SQ=   0.4 DF=  5  SIG.= 0.995

0     ISSUE GROUP =   3   ISSUE =  13   DUMMY ISSUE

      LEVEL 1 NO.<MED.= 21 NO. EXP.= 19     NO.>=MED.= 17 NO. EXP.= 19   CHI-SQ.=   0.4 DF= 1 SIG.= 0.516
      LEVEL 2 NO.<MED.= 16 NO. EXP.= 19     NO.>=MED.= 21 NO. EXP.= 19   CHI-SQ.=   0.4 DF= 1 SIG.= 0.511
      LEVEL 3 NO.<MED.= 19 NO. EXP.= 19     NO.>=MED.= 19 NO. EXP.= 19   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
      LEVEL 4 NO.<MED.= 18 NO. EXP.= 18     NO.>=MED.= 19 NO. EXP.= 19   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
      OVERALL CHI-SQ=   0.9 DF=  7  SIG.= 0.997

0     ISSUE GROUP =   3   ISSUE =  14   DUMMY ISSUE

      LEVEL 1 NO.<MED.= 12 NO. EXP.= 15     NO.>=MED.= 18 NO. EXP.= 15   CHI-SQ.=   1.2 DF= 1 SIG.= 0.273
      LEVEL 2 NO.<MED.= 17 NO. EXP.= 15     NO.>=MED.= 13 NO. EXP.= 15   CHI-SQ.=   0.5 DF= 1 SIG.= 0.465
      LEVEL 3 NO.<MED.= 15 NO. EXP.= 15     NO.>=MED.= 15 NO. EXP.= 15   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
      LEVEL 4 NO.<MED.= 13 NO. EXP.= 15     NO.>=MED.= 17 NO. EXP.= 15   CHI-SQ.=   0.5 DF= 1 SIG.= 0.465
      LEVEL 5 NO.<MED.= 17 NO. EXP.= 15     NO.>=MED.= 13 NO. EXP.= 15   CHI-SQ.=   0.5 DF= 1 SIG.= 0.465
      OVERALL CHI-SQ=   2.8 DF=  9  SIG.= 0.972
```

```
1     CONSEQUENCE MEASURE:
      POP. DOSE 50 MI.


      BASE CASE :
       PEACH BOTTOM LLH (MACCS)

      ISSUE LEVELS FOR EACH SAMPLE MEMBER, IN ORDER OF INCREASING RISK
            RISK  ISSUE LEVELS, FOR ALL ISSUES
             1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
3.558E-01    2  2  2  1  1  2  3  3  4  1  6  3  2  2  2  1  2  1  2  2  2  2  2  2  2  2  4  3  3  2  2  2
1.143E+00    3  2  2  1  3  3  3  2  3  1  5  3  2  2  2  1  2  3  2  2  2  2  2  1  4  2  4  3  2  2  4  1
1.157E+00    2  1  2  2  1  4  1  3  3  1  3  3  1  2  2  2  2  2  2  1  2  2  1  2  2  3  4  3  2  1  4  3
1.163E+00    2  2  3  1  1  3  2  3  2  1  6  2  2  2  1  3  5  2  1  1  1  2  2  3  5  4  3  3  1  2  4  2
1.174E+00    2  2  2  2  2  2  3  3  3  1  8  2  2  1  1  2  2  1  2  2  1  2  1  2  1  2  3  2  1  1  4  3
1.658E+00    3  2  3  2  1  2  3  2  2  1  7  2  2  2  1  3  1  2  2  1  1  1  3  3  2  2  1  2  2  2  4  3
1.985E+00    3  2  3  2  3  2  4  3  1  1  8  3  1  2  2  3  4  2  2  2  1  2  2  2  4  2  2  2  2  2  1  2
2.604E+00    2  2  2  2  2  2  2  2  3  1  6  2  2  1  1  1  1  1  2  2  1  2  2  1  2  4  2  3  3  2  1  3
2.615E+00    2  2  2  1  2  2  2  3  3  1  9  2  2  2  1  2  4  2  2  2  2  2  1  2  4  5  4  2  2  2  4  3
3.041E+00    2  2  2  2  2  1  3  3  2  1  6  3  2  2  2  2  2  2  1  2  2  2  2  2  4  2  4  2  2  2  3  3
3.314E+00    2  2  3  2  3  4  2  3  3  1  6  2  2  1  2  4  1  2  2  2  1  1  2  4  2  2  3  2  1  2  3  2
3.494E+00    3  3  1  1  1  2  3  4  3  1  6  2  2  2  2  2  1  2  2  2  2  2  2  3  4  2  3  2  3  2  2  3
3.664E+00    4  2  3  2  2  3  3  1  2  2  7  2  2  2  1  2  1  2  2  2  1  2  2  3  3  3  2  3  3  1  4  3
3.743E+00    3  2  3  1  1  3  3  4  2  1  5  3  2  1  1  2  3  2  1  2  1  2  3  3  1  2  3  3  1  3  4  3
3.901E+00    3  1  2  2  1  2  1  2  1  1  8  3  2  1  2  3  4  2  2  2  1  2  3  2  3  1  2  2  4  4  4  3
4.109E+00    3  2  1  1  2  2  3  2  1  1  1  3  2  1  1  1  2  1  1  2  1  2  2  4  3  4  4  3  2  1  3  3
4.404E+00    3  3  3  1  1  1  2  2  3  1  4  3  2  1  2  2  2  2  2  1  2  2  3  1  2  2  2  3  1  2  4  3
4.615E+00    2  1  3  2  2  4  3  2  2  1  7  2  2  1  2  1  3  1  1  1  2  1  3  1  2  4  1  2  2  2  4  3
4.615E+00    3  3  2  2  3  3  3  1  1  1  9  3  2  1  1  1  3  2  2  1  2  2  1  3  2  3  4  2  2  1  2  1
4.620E+00    2  2  2  1  2  4  3  3  2  1  8  2  2  2  2  3  2  1  2  2  1  2  3  1  3  2  4  4  3  1  3  4
4.649E+00    3  3  2  1  1  2  3  3  2  1  6  2  2  1  2  2  2  2  2  2  2  2  2  4  3  2  4  4  1  1  1  2
4.928E+00    2  2  3  2  2  3  3  4  4  1  6  2  2  2  1  1  2  2  2  2  2  2  2  3  2  2  3  3  3  1  3  4
5.188E+00    3  1  3  2  4  2  1  3  3  1  7  3  2  2  2  1  3  1  2  1  1  2  2  2  2  2  3  4  2  2  3  2
5.323E+00    4  2  4  2  1  3  3  2  3  1  6  3  2  1  2  3  1  2  2  2  1  2  1  3  1  4  4  4  3  4  3  2
5.537E+00    1  2  2  1  2  2  3  3  3  1  5  2  2  2  1  2  4  1  2  1  2  1  4  4  1  5  3  3  3  2  1  2
5.918E+00    2  2  2  1  2  3  1  3  3  1  3  2  2  2  1  3  2  2  2  2  1  2  1  3  3  2  2  2  3  4  3  3
5.920E+00    2  3  3  2  2  2  2  2  2  1  2  3  2  1  2  3  2  2  2  2  2  2  2  2  5  2  2  3  4  2  2  3
5.955E+00    1  1  3  1  2  3  4  2  2  1  3  3  2  1  2  2  2  1  1  2  1  2  2  1  2  2  2  2  3  3  3  3
6.226E+00    3  2  2  1  1  1  3  2  2  1  5  2  2  2  1  3  4  2  1  2  1  2  2  2  3  3  5  2  2  2  4  4
6.284E+00    1  1  3  2  2  3  4  2  2  1  2  2  2  2  2  1  3  2  1  2  1  1  2  2  3  3  3  2  2  3  2  3
6.539E+00    2  1  3  2  2  1  2  3  4  1  5  2  2  2  1  2  2  3  1  2  2  2  2  3  1  2  3  3  4  2  4  2
6.670E+00    2  2  3  2  2  3  4  2  2  1  9  3  2  2  1  3  3  2  1  1  1  2  1  1  4  3  4  2  2  4  1  2
6.826E+00    2  2  2  1  4  2  2  3  2  1  7  3  2  1  2  1  1  2  2  2  1  2  2  3  4  2  3  3  3  2  4  4
6.866E+00    3  1  2  1  2  3  1  4  2  1  2  2  2  1  1  2  3  2  2  1  2  1  2  1  2  2  3  2  2  2  2  4
7.021E+00    3  2  1  1  3  1  1  3  4  1  9  2  2  2  2  2  4  2  2  2  1  2  2  2  2  4  2  3  2  3  3  2
7.051E+00    2  3  3  1  1  3  2  3  3  2  7  2  2  2  1  2  2  2  2  2  1  2  2  3  4  1  3  3  2  3  4  3
7.090E+00    1  2  2  2  2  2  3  2  2  1  4  3  2  2  1  3  2  2  1  2  1  2  2  1  3  1  2  3  4  3  4  2
7.092E+00    2  3  3  1  3  2  2  3  4  2  8  2  2  1  2  3  2  1  2  1  1  2  2  2  2  4  4  2  2  2  4  2
7.278E+00    3  3  4  2  2  3  2  3  2  1  7  2  1  1  1  2  1  2  2  1  1  2  2  4  3  2  2  1  2  3  2  3
7.612E+00    3  3  2  1  2  2  2  3  2  1  6  2  2  1  2  2  1  1  2  1  2  2  1  2  2  2  3  3  2  3  3  2
7.774E+00    1  3  3  2  1  3  2  2  3  2  3  2  2  1  2  3  3  1  1  1  2  2  2  4  4  2  2  3  3  1  3  2
7.780E+00    3  2  1  2  3  2  3  2  3  1  2  3  1  1  2  3  3  1  2  2  2  2  2  3  1  2  2  3  2  3  3  3
7.861E+00    1  1  2  1  2  2  4  2  2  2  6  2  2  2  1  2  4  1  1  1  2  2  2  3  4  3  4  4  4  4  3  3
7.968E+00    3  2  1  2  3  3  3  3  3  2  5  2  2  1  1  2  5  2  2  2  1  2  2  2  2  2  3  2  2  2  2  3
8.086E+00    2  3  1  1  3  3  3  4  3  2  5  2  2  1  2  3  3  2  1  2  2  2  3  2  4  2  3  3  2  1  3  2
8.313E+00    3  2  3  1  2  2  3  3  4  1  6  2  2  2  1  4  4  2  2  1  2  2  3  3  3  2  3  2  3  2  3  4
8.372E+00    3  2  3  2  2  2  3  2  1  1  5  3  2  2  1  2  2  2  2  2  1  1  2  2  4  4  4  3  2  1  4  3
8.502E+00    4  3  3  1  3  2  3  1  3  2  6  3  2  2  2  3  3  1  2  2  2  2  1  1  3  2  2  2  3  2  2  2
8.552E+00    3  2  3  1  3  4  3  2  2  2  8  2  2  1  2  2  2  1  2  1  2  2  1  3  5  3  2  3  1  3  3  4
8.665E+00    3  2  2  1  3  2  3  3  4  1  7  2  1  1  1  2  3  2  2  2  2  2  3  3  4  4  2  3  3  3  3  1
8.697E+00    1  3  3  1  2  3  2  1  3  1  6  2  2  2  2  3  5  3  2  1  1  2  2  4  4  3  4  3  3  1  1  3
8.877E+00    2  1  2  2  3  3  2  1  2  2  6  2  2  1  1  2  3  1  2  2  2  2  2  2  3  1  4  2  3  3  3  1
8.894E+00    2  2  2  2  2  3  3  2  2  1  9  2  2  2  1  2  3  2  1  2  2  2  2  3  1  3  5  3  3  3  4  4
8.949E+00    3  2  4  1  3  3  3  2  3  2  2  2  2  2  1  3  3  1  2  2  1  2  3  1  4  3  5  1  2  3  4  3
9.192E+00    3  2  2  1  2  3  3  2  3  1  9  2  2  1  1  2  1  2  1  2  2  1  1  4  4  2  3  3  3  2  3  2
9.303E+00    3  3  1  2  2  3  2  2  1  1  6  1  1  1  1  4  3  2  2  2  2  2  2  1  3  1  4  2  1  3  4  2
9.443E+00    4  2  1  2  2  3  2  1  4  1  4  3  2  1  1  2  1  2  1  1  1  1  3  2  4  3  4  4  2  4  4  3
9.584E+00    2  2  3  1  3  3  2  1  3  1  5  2  2  2  2  2  3  1  1  2  2  2  1  3  1  2  5  3  1  2  3  1
9.778E+00    2  3  2  1  2  4  3  2  3  2  6  2  2  1  1  2  1  1  2  1  2  2  1  3  4  1  4  4  2  2  3  2
9.781E+00    3  2  2  1  2  4  2  3  3  1  8  3  2  1  2  2  1  1  1  2  2  2  3  1  4  3  4  3  3  2  3  3
1.002E+01    1  3  2  1  3  3  4  2  3  1  3  3  2  1  2  2  2  3  2  2  2  2  2  1  2  2  3  2  1  3  3  2
1.044E+01    3  2  3  2  3  2  3  4  2  1  8  2  2  2  1  2  3  1  2  1  1  2  1  3  4  2  5  3  3  2  3  3
1.056E+01    3  3  2  1  3  3  1  1  4  1  5  3  2  1  2  2  3  1  2  2  2  2  2  3  1  2  4  3  3  1  2  3
1.059E+01    3  2  2  1  3  3  3  4  2  1  6  2  2  1  2  3  1  2  1  1  1  2  3  3  3  1  5  3  3  1  3  4
1.090E+01    3  1  2  1  2  3  2  2  2  2  5  2  2  1  2  2  3  2  2  1  2  2  3  2  2  4  3  3  3  3  3  4
1.124E+01    4  3  3  2  2  3  3  1  2  1  4  2  1  1  2  2  5  1  2  2  1  2  3  2  2  2  4  2  3  1  4  3
1.230E+01    3  2  2  2  2  3  2  3  4  1  2  2  2  1  1  3  5  2  2  1  1  1  2  3  3  3  5  4  3  3  4  2
1.269E+01    3  3  1  1  2  3  4  3  3  1  3  3  2  2  1  2  2  1  1  2  1  2  2  2  2  2  2  3  3  1  4  3
1.297E+01    2  1  4  1  3  2  3  1  3  1  6  2  2  2  2  2  2  3  1  2  2  2  2  3  2  2  3  3  1  3  2  3
1.299E+01    1  2  2  2  4  4  1  2  2  1  2  2  2  1  2  2  1  1  2  2  2  1  1  2  5  5  4  1  3  2  3  2
1.304E+01    3  2  2  1  3  1  2  2  2  1  9  2  2  2  1  3  1  3  2  1  2  2  2  3  2  3  3  4  2  3  4  3
1.319E+01    2  2  2  1  3  4  3  2  2  1  6  3  2  2  2  3  5  2  1  1  2  2  1  4  2  2  2  3  2  2  4  3
1.332E+01    2  2  4  1  4  2  3  3  3  1  6  2  2  2  1  3  2  2  2  2  1  2  1  1  2  2  2  3  2  1  4  3
1.354E+01    2  3  1  2  3  3  2  3  2  1  4  2  2  2  1  2  2  2  2  1  1  2  3  3  2  3  3  3  4  1  3  2
1.403E+01    1  2  2  2  4  3  2  3  3  1  8  2  2  1  1  2  3  3  2  2  1  2  3  3  4  1  4  2  2  2  4  2
1.412E+01    4  3  3  1  2  3  3  3  2  1  6  2  2  1  2  2  2  1  2  1  2  2  2  3  3  4  2  3  3  2  2  3
```

```
1.418E+01  3 2 3 1 3 2 2 2 2 1 3 2 2 2 2 3 3 2 2 2 1 2 2 3 4 2 1 4 3 3 3 3
1.450E+01  4 2 1 1 2 4 1 1 4 1 8 3 2 2 2 1 3 2 1 1 1 2 2 2 4 2 4 3 1 3 2 3
1.465E+01  1 3 2 1 2 2 2 3 2 1 8 2 2 1 1 2 2 1 2 2 1 2 3 2 3 2 3 3 2 3 1 2
1.497E+01  2 1 3 1 3 1 3 3 3 1 3 2 2 2 1 2 4 1 2 2 1 1 1 1 3 2 5 4 2 1 2 3
1.591E+01  3 2 3 1 3 3 2 2 2 1 7 3 2 1 2 3 4 3 1 1 1 2 2 2 2 3 5 3 2 3 2 3
1.609E+01  3 2 3 1 2 3 1 2 2 2 2 2 2 2 1 2 2 2 1 2 1 1 3 2 2 1 3 2 3 3 2 2
1.615E+01  3 2 3 1 3 3 4 4 3 1 7 2 2 2 1 3 2 1 1 1 1 2 4 3 2 3 2 3 3 3 4 2
1.650E+01  2 3 2 1 2 1 2 3 1 1 5 3 2 2 1 2 1 1 2 2 1 2 2 1 2 5 2 4 1 2 2 2
1.745E+01  2 1 4 1 4 2 3 2 2 1 4 3 2 2 2 2 3 1 2 1 1 2 2 4 3 2 4 4 2 3 4 3
1.768E+01  2 3 2 2 3 2 2 2 2 1 4 1 2 2 2 1 3 2 2 1 1 2 2 1 4 2 2 3 2 2 3 4
1.780E+01  3 3 2 1 2 1 2 3 3 1 2 2 2 2 2 2 3 2 2 1 1 2 1 2 3 3 4 3 2 4 4 3
1.792E+01  4 2 2 1 3 2 3 2 3 1 3 2 2 1 1 3 2 1 2 2 2 1 2 3 4 1 4 2 3 1 4 3
1.845E+01  2 2 2 2 3 1 1 3 1 1 2 2 2 1 1 3 3 1 1 2 2 2 1 2 3 2 2 3 2 4 4 2
1.922E+01  2 3 3 1 3 3 2 1 1 1 7 2 2 1 1 2 2 2 2 2 2 2 2 2 1 1 3 3 3 2 3 3
1.947E+01  3 3 2 2 2 2 3 2 2 1 8 2 2 1 2 2 2 2 2 2 2 2 3 2 2 2 5 3 3 3 4 3
1.988E+01  1 2 3 1 3 2 3 2 2 1 6 2 2 1 1 2 1 2 1 1 2 2 4 3 2 1 4 4 3 4 1 2
1.996E+01  1 3 3 2 3 2 3 3 4 1 7 3 2 2 2 2 2 2 1 1 2 2 3 2 3 2 4 2 2 2 2 2
2.057E+01  2 2 1 1 3 2 2 4 1 1 6 2 2 2 2 3 3 1 1 1 2 2 2 3 2 2 2 3 4 3 3 3
2.149E+01  2 2 3 2 3 1 2 2 3 1 8 2 2 1 1 2 4 1 1 1 2 1 2 1 2 2 4 4 3 1 3 3
2.255E+01  3 2 3 2 3 2 2 3 3 1 3 2 2 1 2 2 1 3 1 1 2 2 1 3 3 3 4 4 4 3 4 2
2.295E+01  3 2 3 1 4 1 3 3 2 1 6 2 2 1 1 2 4 2 1 1 2 2 3 3 5 4 2 3 2 3 3 3
2.436E+01  3 2 3 1 3 2 2 3 1 1 5 2 2 2 2 3 1 2 1 1 2 1 1 2 2 3 5 1 2 1 1 4
2.455E+01  2 3 4 2 3 2 2 2 3 1 5 2 1 2 2 2 2 1 1 1 1 2 3 1 2 2 3 3 2 2 2 3
2.481E+01  4 2 1 2 3 4 4 2 2 1 6 2 2 2 2 2 4 1 1 2 2 1 3 3 2 2 3 2 3 2 3 3
2.504E+01  2 3 4 2 3 3 3 2 3 2 3 2 2 2 2 2 1 1 1 2 2 2 2 3 5 1 4 3 1 3 3 2
2.607E+01  3 1 4 1 3 3 2 4 3 1 8 3 2 1 1 3 5 1 1 2 2 1 2 1 2 3 3 4 3 2 1 1
2.725E+01  4 2 2 2 3 2 4 2 3 1 3 2 2 2 1 2 1 2 1 2 2 2 2 3 4 2 2 4 2 4 3 4
2.758E+01  2 3 1 1 3 2 3 3 3 1 7 3 2 2 1 3 2 1 2 2 2 1 2 2 2 2 4 3 2 3 3 2
2.815E+01  2 3 3 2 3 3 2 3 2 1 1 2 2 1 1 3 2 2 2 2 2 2 3 2 4 4 4 2 2 3 1 3
3.249E+01  3 3 3 2 2 3 3 3 2 1 6 2 1 2 1 2 4 3 2 1 1 1 2 3 3 4 3 4 2 1 4 2
3.303E+01  2 3 3 2 2 3 2 2 4 2 9 2 2 1 1 3 2 2 1 1 2 2 2 1 1 2 3 4 2 2 3 3
3.357E+01  2 3 2 1 2 2 3 2 4 1 7 2 2 1 2 3 3 1 1 2 1 2 1 2 3 1 1 3 2 2 2 3
3.390E+01  2 3 3 1 4 2 2 3 3 1 6 2 2 2 1 2 4 2 1 1 1 2 3 3 3 4 3 2 1 2 4 3
3.401E+01  2 3 2 1 2 2 1 3 1 1 4 2 2 1 2 2 3 2 1 2 2 2 1 2 1 2 2 2 2 2 4 3
3.458E+01  2 3 4 2 2 3 1 2 3 1 6 3 2 2 2 2 2 1 1 2 1 2 2 4 2 2 3 2 4 2 4 2
3.491E+01  3 2 4 2 2 1 2 3 3 1 4 2 2 2 2 3 5 2 1 2 2 2 2 3 2 2 4 3 2 2 4 4
3.700E+01  4 3 3 1 2 3 2 3 2 1 3 2 2 1 1 2 4 1 1 1 2 2 3 4 2 1 4 2 3 2 2 2
3.754E+01  3 3 2 2 2 2 3 3 3 2 6 2 1 2 2 3 2 1 1 1 1 2 2 3 1 3 3 2 2 3 3 3
4.170E+01  3 3 2 2 2 2 2 3 2 1 3 3 2 2 2 2 3 1 1 1 1 1 2 4 3 2 2 3 2 4 2 3
4.237E+01  2 3 2 1 2 3 2 1 3 1 5 2 1 1 1 3 5 2 1 2 1 2 1 2 2 5 2 3 3 2 2 3
4.925E+01  3 3 3 2 2 2 2 2 1 1 9 3 2 2 2 3 3 1 1 2 2 1 3 2 2 3 4 3 3 3 4 3
4.969E+01  2 3 2 1 2 2 4 2 4 1 5 3 2 1 2 2 5 2 1 1 1 2 1 2 2 2 3 2 3 3 3 2
4.999E+01  2 3 3 1 3 2 4 3 2 1 2 3 2 1 2 1 3 2 2 2 2 2 3 3 2 4 5 3 3 3 4 3
5.015E+01  2 3 2 1 3 2 3 3 1 2 5 2 1 2 2 2 2 2 1 2 2 2 2 1 4 3 3 3 3 2 4 2
5.098E+01  1 3 1 1 2 3 2 2 3 1 5 1 2 2 2 2 2 1 1 2 1 1 1 2 2 2 4 4 3 1 3 2
5.270E+01  2 3 2 1 2 3 3 3 2 1 8 1 2 1 2 2 4 3 1 1 1 2 1 3 3 2 4 3 4 3 4 3
5.359E+01  2 3 3 1 3 2 3 2 3 1 7 2 1 1 2 3 2 1 1 1 1 2 2 3 3 2 4 3 2 2 4 4
5.433E+01  4 3 3 2 3 3 2 4 3 2 3 3 2 1 2 3 2 2 1 1 1 1 3 2 4 4 2 2 2 3 3 3
5.509E+01  2 2 2 1 4 2 3 2 1 1 9 2 2 1 2 3 1 1 1 1 1 1 2 4 4 2 3 2 3 3 4 2
5.578E+01  4 2 3 1 4 2 3 4 3 2 6 2 1 1 2 2 3 2 1 1 2 2 2 1 2 2 4 2 4 2 1 3
5.705E+01  3 3 4 1 3 2 1 4 3 2 7 2 1 1 1 1 2 1 1 2 2 1 3 4 3 4 3 3 1 3 4 3
6.060E+01  3 3 2 1 3 2 2 2 2 1 7 3 2 1 1 3 1 3 1 2 1 2 3 1 3 4 4 4 2 3 3 1
6.184E+01  2 3 2 2 3 3 3 2 2 1 7 3 2 1 1 4 3 2 1 2 1 2 2 2 3 3 3 3 2 3 2 4
6.342E+01  3 3 2 2 3 4 4 3 3 1 5 3 2 1 1 1 5 2 1 2 1 2 1 3 2 2 3 2 2 4 4 2
7.175E+01  2 3 2 1 3 2 3 2 3 1 7 2 2 2 1 2 1 3 1 2 1 2 3 3 2 4 4 2 3 4 2 2
7.342E+01  3 3 3 2 3 1 3 1 2 1 3 3 2 2 1 3 3 2 1 2 2 1 3 1 4 3 5 2 3 3 3 2
7.376E+01  3 3 3 1 3 3 2 2 2 1 6 2 2 2 1 1 5 1 1 2 1 2 2 1 2 4 4 3 3 3 2 4
8.155E+01  3 3 2 1 4 1 2 2 2 1 9 2 2 1 2 2 4 1 1 2 1 2 2 2 2 2 3 3 1 3 4 2
8.282E+01  2 4 3 1 4 2 2 2 3 2 7 3 2 2 1 2 1 2 2 1 2 2 3 2 1 3 2 2 4 1 2 3
9.024E+01  3 4 2 2 4 3 2 3 2 1 5 2 2 2 2 2 4 2 2 1 2 2 3 3 2 2 3 2 3 2 4 2
9.976E+01  2 3 4 1 4 4 3 3 3 1 3 3 2 2 2 3 1 1 1 1 2 2 1 2 4 4 3 2 3 2 4 3
1.181E+02  3 4 4 1 3 2 2 4 2 2 8 2 2 2 2 2 4 2 2 2 2 1 1 3 3 2 3 3 4 2 3 3
1.393E+02  2 4 2 1 3 3 2 3 3 1 6 3 2 1 1 2 4 1 2 2 1 2 2 1 5 2 3 2 3 2 3 3
1.578E+02  2 4 3 2 2 3 2 3 2 1 3 3 2 1 2 2 5 1 2 2 2 2 2 2 2 2 3 3 2 3 3 2
1.988E+02  3 4 4 1 2 3 3 2 2 1 3 2 2 2 2 3 1 2 1 2 2 2 2 2 2 4 4 3 1 2 3 3
2.104E+02  3 4 3 1 2 2 2 2 3 1 6 3 2 2 2 3 5 1 1 2 1 2 2 2 4 2 5 3 2 2 3 4
2.793E+02  1 4 3 2 1 3 2 3 3 1 9 2 2 1 1 2 2 1 1 2 2 2 2 1 4 3 4 2 2 3 4 3
3.381E+02  2 4 3 1 3 4 2 3 2 1 6 2 2 2 1 3 3 1 2 2 2 2 3 3 2 2 2 3 2 4 3 3
3.496E+02  4 4 3 2 1 2 4 3 2 1 5 1 2 1 1 2 1 2 1 2 1 2 1 2 3 2 2 4 4 2 3 2
4.443E+02  3 4 3 1 4 3 3 1 3 2 6 2 2 1 1 2 4 1 2 2 1 1 2 2 2 3 4 3 2 4 4 4
4.979E+02  4 4 3 2 2 3 2 2 2 1 6 3 2 1 1 2 3 2 1 2 2 2 3 2 4 2 2 3 3 3 3 3
5.277E+02  3 4 2 2 3 2 2 3 2 1 3 3 2 2 1 2 5 3 2 1 2 2 3 2 2 2 4 3 2 3 3 4
6.221E+02  2 4 2 1 2 3 4 4 3 1 5 3 2 1 1 3 1 2 1 1 1 1 1 2 3 4 4 2 4 3 3 3
6.401E+02  2 4 3 1 3 4 1 2 3 1 6 2 2 2 1 3 2 3 1 2 1 2 1 2 2 2 5 3 3 2 3 4
    MEAN =      4.936E+01      VARIANCE =      1.170E+04

    PERCENTILES :
        5-TH =     2.604E+00  50-TH =      1.408E+01  95-TH =      2.793E+02
    LOGARITHMIC MIDPOINT (OF POINTS > 0.) =      1.542E+01
    NUMBER ABOVE MIDPOINT = 70
    NUMBER BELOW MIDPOINT =  80
    CHI-SQUARED(1) =     6.667E-01
    DO NOT REJECT NULL (p > .05)
```

CONSEQUENCE MEASURE:
POP. DOSE 50 MI.

BASE CASE :
PEACH BOTTOM LLH (MACCS)

FRACTIONAL CONTRIBUTION OF EACH SEQUENCE TO MEAN RISK

SEQUENCE	CONTRIBUTION
TB	0.1483
TBUX	0.0093
TBU	0.0072
TCSX	0.0095
TCUX	0.0032
TCSRX2	0.0186
TCSRV23	0.0038

CONSEQUENCE MEASURE:
POP. DOSE 50 MI.

BASE CASE :
PEACH BOTTOM LLH (MACCS)

FRACTIONAL CONTRIBUTION OF EACH NONZERO BIN TO MEAN RISK

BIN	CONTRIBUTION
AAACAAGEFABCCABBEDABBB	0.0002
AAACAAGEFABCCABBEEABBB	0.0002
AAACACGEFABCCABBEDABBB	0.0002
AAACACGEFABCCABBEEABBB	0.0002
AAACACGGDABCBABBECABBB	0.0002
AAACACGGDABCBABBEDABBB	0.0005
AAACACGGDABCBABBEEABBB	0.0006
AAACACGGDABCBADBECABBB	0.0001
AAACACGGDABCBADBEDABBB	0.0004
AAACACGGDABCBADBEEABBB	0.0005
BAACAAGBDAACBBBBHHABBB	0.0001
BAACAAGBDAACBDDBHHABBB	0.0001
BAACAAGBDABCBBBBHHABBB	0.0004
BAACAAGBDABCBDDBHHABBB	0.0001
BAACAAGBFAACCBBBHHABBB	0.0001
BAACAAGBFABCCBBBHHABBB	0.0003
BAACAAGBFABCCDDBHHABBB	0.0001
BAACACGBDAACBBBBHHABBB	0.0027
BAACACGBDAACBDDBHHABBB	0.0015
BAACACGBDABCBBBBHHABBB	0.0004
BAACACGBDABCBDDBHHABBB	0.0003
BAACACGBFAACCBBBHHABBB	0.0009
BAACACGBFAACCDDBHHABBB	0.0002
BAACACGBFABCCBBBHHABBB	0.0007
BAACACGBFABCCDDBHHABBB	0.0001
BAACACGGDAACBABBDDABBB	0.0002
BAACACGGDAACBADBDDABBB	0.0001
BAACACGGDABCBABBDEABBB	0.0001
BABBACGGDAACBABBEGABBB	0.0001
BABBACGGDABCBABBEGABBB	0.0001
BABBACGGDABCBADBEGABBB	0.0001
BACBAAGCFABCCBBBHHABBB	0.0002
BACBAAGCFABCCDDBHHABBB	0.0001
CAACAABGDDACBABBADABAB	0.0001
CAACAABGDDACBABBAEABAB	0.0001
CAACAABGFDACBCCBAEABAB	0.0001
CAACACBGDABCBABBADABAB	0.0001
CAACACBGDABCBABBAEABAB	0.0001
CAACACBGDDACBABBADABAB	0.0003
CAACACBGDDACBABBAEABAB	0.0003
CAACACBGDDACBABBAGABAB	0.0001
CAACACBGDDACBCDBACABAB	0.0002
CAACACBGDDACBCDBADABAB	0.0001
CAACACBGDDACBCDBAEABAB	0.0004
CAACACBGDDACBCDBAFABAB	0.0001
CAACACBGFDACBCCBACABAB	0.0001
CAACACBGFDACBCCBADABAB	0.0001
CAACACBGFDACBCCBAEABAB	0.0001
CAACACBGFDACBCDBACABAB	0.0001
CAACACBGFDACBCDBADABAB	0.0002
CAACACBGFDACBCDBAEABAB	0.0003
CAACCCBGDDACBABBADABAB	0.0001
CAACCCBGDDACBABBAEABAB	0.0001
DAAAAAGBDABCBBBBHHABBB	0.0008
DAAAAAGBDABCBDDBHHABBB	0.0001

```
DAAAAAGBDDACBBBBHHABBB          0.0004
DAAAAAGBDDACBDDBHHABBB          0.0006
DAAAAAGBFABCCBBBHHABBB          0.0008
DAAAAAGBFABCCDDBHHABBB          0.0001
DAAAAAGBFDACCBBBHHABBB          0.0012
DAAAAAGBFDACCDDBHHABBB          0.0004
DAAAACGBDABCBBBBHHABBB          0.0006
DAAAACGBDABCBDDBHHABBB          0.0001
DAAAACGBDDACBBBBHHABBB          0.0023
DAAAACGBDDACBBBBHHBABB          0.0001
DAAAACGBDDACBDDBHHABBB          0.0018
DAAAACGBFABCCBBBHHABBB          0.0009
DAAAACGBFABCCDDBHHABBB          0.0002
DAAAACGBFDACCBBBHHABBB          0.0018
DAAAACGBFDACCDDBHHABBB          0.0006
DAAAACGGDDACBBBBADABAB          0.0001
DAAAACGGDDACBBBBAEABAB          0.0003
DAAAACGGDDACBDDBADABAB          0.0001
DAAAACGGDDACBDDBAEABAB          0.0002
DAAACCGBDDACBBBBHHABBB          0.0003
DAAACCGBDDACBDDBHHABBB          0.0001
DAAACCGBFDACCBBBHHABBB          0.0001
DAAACCGBFDACCDDBHHABBB          0.0001
DABAAAGADABCBBBBHGABAB          0.0001
DABAAAGADABCBDDBHGABAB          0.0002
DABAAAGADDACBBBBHGABAB          0.0002
DABAAAGADDACBDDBHGABAB          0.0001
DABAACGADABCBBBBHGABAB          0.0008
DABAACGADABCBDDBHGABAB          0.0001
DABAACGADDACBBBBHGABAB          0.0014
DABAACGADDACBDDBHGABAB          0.0006
DACAAAGADABCCBBBHHABBB          0.0002
DACAAAGADABCCDDBHHABBB          0.0001
EBAACCFGFDBCBADBEHABBB          0.0001
EBAACCFGFDBCBADBEHBBBB          0.0002
EBAACCGGDDBCBABBEGABBB          0.0005
EBAACCGGDDBCBABBEGBBBB          0.0003
EBAACCGGDDBCBABBEHABBB          0.0020
EBAACCGGDDBCBABBEHBBBB          0.0019
EBAACCGGDDBCBADBEHABBB          0.0011
EBAACCGGDDBCBADBEHBBBB          0.0009
EBACBBGEFCBCCABBFBBABA          0.0001
EBACBBGEFCBCCABBFCABBA          0.0001
EBACBBGEFCBCCABBFCBABA          0.0004
EBACBBGEFCBCCABBFEABBA          0.0009
EBACBBGEFCBCCABBFFABBA          0.0001
EBACBBGGDCBBBABBFFABBA          0.0001
EBACBBGGDCBCBABBFBBABA          0.0107
EBACBBGGDCBCBABBFCBABA          0.0022
EBACBBGGDCBCBABBFDABBA          0.0007
EBACBBGGDCBCBABBFEABBA          0.0017
EBACBBGGDCBCBABBFFABBA          0.0013
EBACBBGGDCBCBABBFGABBA          0.0001
EBACBCGEFCBCCABBFBBABA          0.0001
EBACBCGEFCBCCABBFCBABA          0.0004
EBACBCGEFCBCCABBFEABBA          0.0004
EBACBCGEFCBCCABBFFABBA          0.0001
EBACBCGGDCBBBABBFFABBA          0.0001
EBACBCGGDCBCBABBFBBABA          0.0067
EBACBCGGDCBCBABBFCBABA          0.0021
EBACBCGGDCBCBABBFDABBA          0.0010
EBACBCGGDCBCBABBFEABBA          0.0027
EBACBCGGDCBCBABBFFABBA          0.0013
EBACBCGGDCBCBABBFFBBBA          0.0010
EBACBCGGDCBCBABBFGABBA          0.0001
EBACBCGGDCBCBADBFBBABA          0.0044
EBACBCGGDCBCBADBFEABBA          0.0004
EBACBCGGDCBCBADBFFABBA          0.0004
EBACCCDEEDBCCADBFBBABB          0.0002
EBACCCDGFDBCBABBFBBABB          0.0005
EBACCCDGFDBCBACBFBBABB          0.0001
EBACCCDGFDBCBADBFBBABB          0.0043
EBACCCFGFDBBBABBFBBABB          0.0004
EBACCCFGFDBBBACBFEABBB          0.0002
EBACCCFGFDBBBADBFCBABB          0.0010
EBACCCFGFDBBBADBFEABBB          0.0029
EBACCCFGFDBBBADBFFABBB          0.0001
EBACCCFGFDBCBABBFBBABB          0.0011
EBACCCFGFDBCBABBFCABBB          0.0001
EBACCCFGFDBCBABBFCBABB          0.0080
EBACCCFGFDBCBABBFEABBB          0.0219
EBACCCFGFDBCBABBFEBBBB          0.0004
EBACCCFGFDBCBABBFFABBB          0.0002
EBACCCFGFDBCBABBFGABBB          0.0001
EBACCCFGFDBCBACBFBBABB          0.0001
EBACCCFGFDBCBACBFCBABB          0.0020
```

203

EBACCCFGFDBCBACBFEABBB	0.0012
EBACCCFGFDBCBADBFBBABB	0.0011
EBACCCFGFDBCBADBFCABBB	0.0005
EBACCCFGFDBCBADBFCBABB	0.0242
EBACCCFGFDBCBADBFDBBBB	0.0001
EBACCCFGFDBCBADBFEABBB	0.0128
EBACCCFGFDBCBADBFEBBBB	0.0030
EBACCCFGFDBCBADBFFABBB	0.0008
EBACCCFGFDBCBADBFFBBBB	0.0001
EBACCCFGFDBCBADBFGABBB	0.0003
EBACCCGDFDBCBABBFABAAB	0.0001
EBACCCGDFDBCBABBFBBABB	0.0003
EBACCCGDFDBCCABBFBBABB	0.0002
EBACCCGEFDBBCABBFBBABB	0.0002
EBACCCGEFDBCCABBFBBABB	0.0005
EBACCCGEFDBCCABBFCABBB	0.0002
EBACCCGEFDBCCABBFCBABB	0.0006
EBACCCGEFDBCCABBFEABBB	0.0009
EBACCCGEFDBCCADBFCBABB	0.0077
EBACCCGEFDBCCADBFEBBBB	0.0010
EBACCCGFFDBCBABBFEABBB	0.0004
EBACCCGFFDBCCABBFEABBB	0.0002
EBACCCGGDDBBBABBFABABB	0.0019
EBACCCGGDDBBBABBFBBABB	0.0002
EBACCCGGDDBBBABBFEABBB	0.0020
EBACCCGGDDBBBABBFFABBB	0.0014
EBACCCGGDDBBBABBFGABBB	0.0001
EBACCCGGDDBBBADBFABABB	0.0013
EBACCCGGDDBBBADBFCBABB	0.0014
EBACCCGGDDBBBADBFEABBB	0.0003
EBACCCGGDDBBBADBFFBBBB	0.0002
EBACCCGGDDBCBABBFABABB	0.0803
EBACCCGGDDBCBABBFBABAB	0.0003
EBACCCGGDDBCBABBFBBABB	0.2172
EBACCCGGDDBCBABBFCBABB	0.0366
EBACCCGGDDBCBABBFCBBBB	0.0034
EBACCCGGDDBCBABBFDABBB	0.0143
EBACCCGGDDBCBABBFDBBBB	0.0010
EBACCCGGDDBCBABBFEABBB	0.0453
EBACCCGGDDBCBABBFEBBBB	0.0177
EBACCCGGDDBCBABBFFABBB	0.0380
EBACCCGGDDBCBABBFFBBBB	0.0074
EBACCCGGDDBCBABBFGABBB	0.0097
EBACCCGGDDBCBADBFABABB	0.0310
EBACCCGGDDBCBADBFBBABB	0.0598
EBACCCGGDDBCBADBFCBABB	0.0042
EBACCCGGDDBCBADBFEABBB	0.0144
EBACCCGGDDBCBADBFEBBBB	0.0007
EBACCCGGDDBCBADBFFABBB	0.0053
EBACCCGGDDBCBADBFFBBBB	0.0075
EBACCCGGDDBCBADBFGABBB	0.0001
EBACCCGGEDBBBABBFBBABB	0.0012
EBACCCGGEDBBBABBFEABBB	0.0001
EBACCCGGEDBBBABBFFBBBB	0.0002
EBACCCGGEDBBBADBFEABBB	0.0025
EBACCCGGEDBCBABBFBBABB	0.0027
EBACCCGGEDBCBABBFCABBB	0.0001
EBACCCGGEDBCBABBFCBABB	0.0157
EBACCCGGEDBCBABBFCBBBB	0.0025
EBACCCGGEDBCBABBFEABBB	0.0131
EBACCCGGEDBCBABBFEBBBB	0.0010
EBACCCGGEDBCBABBFFABBB	0.0005
EBACCCGGEDBCBABBFFBBBB	0.0003
EBACCCGGEDBCBABBFGABBB	0.0003
EBACCCGGEDBCBABBFGBBBB	0.0001
EBACCCGGEDBCBADBFCBABB	0.0126
EBACCCGGEDBCBADBFEABBB	0.0042
EBACCCGGEDBCBADBFEBBBB	0.0007
EBACCCGGEDBCBADBFFBBBB	0.0001
EBBBACGEFBBCCABBDGABBB	0.0008
EBBBACGEFBBCCABBEGABBB	0.0008
EBBBACGGDBBBBABBDGABBB	0.0003
EBBBACGGDBBBBABBEGABBB	0.0003
EBBBACGGDBBCBABBDGABBB	0.0015
EBBBACGGDBBCBABBEGABBB	0.0018
EBBBACGGDBBCBADBDGABBB	0.0013
EBBBACGGDBBCBADBEGABBB	0.0013
FCACBBGGDCBCBABBDBBABA	0.0001
FCACBBGGDCBCBABBDCBABA	0.0002
FCACBBGGDCBCBABBDDABBA	0.0001
FCACBBGGDCBCBABBDEABBA	0.0001
FCACBBGGDCBCBABBEBBABA	0.0001
FCACBBGGDCBCBABBECBABA	0.0001
FCACBBGGDCBCBABBEEABBA	0.0002
FCACBCGGDCBCBABBDBBABA	0.0001
FCACBCGGDCBCBABBDCBABA	0.0001

FCACBCGGDCBCBABBDDABBA	0.0001
FCACBCGGDCBCBABBDEABBA	0.0002
FCACBCGGDCBCBABBEBBABA	0.0001
FCACBCGGDCBCBABBEEABBA	0.0002
FCACBCGGDCBCBADBDCBABA	0.0002
FCACBCGGDCBCBADBDFABBA	0.0001
FCACBCGGDCBCBADBECBABA	0.0002
FCACBCGGDCBCBADBEEABBA	0.0001
FCACCCDEEDBCCADBEBBABB	0.0001
FCACCCDGFDBBBADBEEBABB	0.0001
FCACCCDGFDBCBACBEBBABB	0.0002
FCACCCDGFDBCBADBDBBABB	0.0008
FCACCCDGFDBCBADBDCBABB	0.0004
FCACCCDGFDBCBADBDEABBB	0.0004
FCACCCDGFDBCBADBEBBABB	0.0024
FCACCCDGFDBCBADBECBABB	0.0003
FCACCCFGFDBBBADBDFABBB	0.0001
FCACCCFGFDBCBABBDEABBB	0.0004
FCACCCFGFDBCBABBDFABBB	0.0001
FCACCCFGFDBCBABBECBABB	0.0001
FCACCCFGFDBCBABBEEABBB	0.0009
FCACCCFGFDBCBABBGEABBB	0.0008
FCACCCFGFDBCBADBCFABBB	0.0002
FCACCCFGFDBCBADBDEBBBB	0.0001
FCACCCFGFDBCBADBDFABBB	0.0002
FCACCCFGFDBCBADBEBBABB	0.0003
FCACCCFGFDBCBADBECBABB	0.0003
FCACCCFGFDBCBADBEEABBB	0.0016
FCACCCFGFDBCBADBEEBBBB	0.0001
FCACCCFGFDBCBADBEFABBB	0.0002
FCACCCFGFDBCBADBEGABBB	0.0003
FCACCCFGFDBCBADBGBBABB	0.0001
FCACCCGBDDBCBABBHHABBB	0.0003
FCACCCGBDDBCBABBHHBABB	0.0001
FCACCCGBDDBCBDDBHHABBB	0.0009
FCACCCGBDDBCBDDBHHBABB	0.0006
FCACCCGBFDBBCDDBHHABBB	0.0001
FCACCCGBFDBCCDDBHHABBB	0.0003
FCACCCGBFDBCCDDBHHBABB	0.0002
FCACCCGDFDBCBABBEBBABB	0.0002
FCACCCGDFDBCBADBDCBABB	0.0003
FCACCCGDFDBCCABBEBBABB	0.0001
FCACCCGDFDBCCADBDCBABB	0.0001
FCACCCGEFDBCCABBEEABBB	0.0002
FCACCCGEFDBCCADBEGABBB	0.0005
FCACCCGFFDBCBABBGEABBB	0.0001
FCACCCGFFDBCCABBGEABBB	0.0001
FCACCCGGDDBBBABBECBABB	0.0002
FCACCCGGDDBBBABBEEABBB	0.0027
FCACCCGGDDBBBADBGCBABB	0.0005
FCACCCGGDDBCBABBCABABB	0.0001
FCACCCGGDDBCBABBCBBABB	0.0020
FCACCCGGDDBCBABBDABABB	0.0015
FCACCCGGDDBCBABBDBBABB	0.0078
FCACCCGGDDBCBABBDCABBB	0.0002
FCACCCGGDDBCBABBDCBABB	0.0039
FCACCCGGDDBCBABBDDABBB	0.0029
FCACCCGGDDBCBABBDEABBB	0.0043
FCACCCGGDDBCBABBDEBBBB	0.0003
FCACCCGGDDBCBABBDFABBB	0.0027
FCACCCGGDDBCBABBDFBBBB	0.0002
FCACCCGGDDBCBABBDGABBB	0.0056
FCACCCGGDDBCBABBEABABB	0.0032
FCACCCGGDDBCBABBEBBABB	0.0107
FCACCCGGDDBCBABBECBABB	0.0026
FCACCCGGDDBCBABBEDABBB	0.0012
FCACCCGGDDBCBABBEEABBB	0.0144
FCACCCGGDDBCBABBEEBBBB	0.0005
FCACCCGGDDBCBABBEFABBB	0.0017
FCACCCGGDDBCBABBEFBBBB	0.0004
FCACCCGGDDBCBABBEGABBB	0.0011
FCACCCGGDDBCBABBGABABB	0.0002
FCACCCGGDDBCBABBGBBABB	0.0017
FCACCCGGDDBCBABBGCBABB	0.0021
FCACCCGGDDBCBABBGEABBB	0.0002
FCACCCGGDDBCBACBEABABB	0.0001
FCACCCGGDDBCBADBDABABB	0.0012
FCACCCGGDDBCBADBDBBABB	0.0020
FCACCCGGDDBCBADBDCBABB	0.0027
FCACCCGGDDBCBADBDEABBB	0.0020
FCACCCGGDDBCBADBDEBBBB	0.0002
FCACCCGGDDBCBADBDFABBB	0.0016
FCACCCGGDDBCBADBDGABBB	0.0058
FCACCCGGDDBCBADBEABABB	0.0021
FCACCCGGDDBCBADBEBBABB	0.0011
FCACCCGGDDBCBADBECBABB	0.0064

FCACCCGGDDBCBADBEEABBB	0.0025
FCACCCGGDDBCBADBEEBBBB	0.0002
FCACCCGGDDBCBADBEFABBB	0.0006
FCACCCGGDDBCBADBEFBBBB	0.0001
FCACCCGGDDBCBADBGCBABB	0.0009
FCACCCGGDDBCBADBGEABBB	0.0008
FCACCCGGDDBCBDDBHABABB	0.0001
FCACCCGGEDBBBABBDEABBB	0.0002
FCACCCGGEDBCBABBDEABBB	0.0005
FCACCCGGEDBCBABBDFABBB	0.0001
FCACCCGGEDBCBABBEBBABB	0.0007
FCACCCGGEDBCBABBECBABB	0.0001
FCACCCGGEDBCBABBEEABBB	0.0019
FCACCCGGEDBCBABBEFABBB	0.0001
FCACCCGGEDBCBABBGEABBB	0.0013
FCACCCGGEDBCBABBGFABBB	0.0002
FCACCCGGEDBCBADBCFABBB	0.0002
FCACCCGGEDBCBADBDCBABB	0.0002
FCACCCGGEDBCBADBEGABBB	0.0002
FCBBAAGCDBBBBBBBHHABBB	0.0004
FCBBAAGCDBBBBDDBHHABBB	0.0002
FCBBAAGCDBBCBBBBHHABBB	0.0007
FCBBAAGCDBBCBDDBHHABBB	0.0002
FCBBAAGCFBBBCBBBHHABBB	0.0003
FCBBAAGCFBBBCDDBHHABBB	0.0001
FCBBAAGCFBBCCBBBHHABBB	0.0008
FCBBAAGCFBBCCDDBHHABBB	0.0003
FCBBAAGGDBBCBABBEGABBB	0.0001
FCBBACGCDBBABBBBHHABBB	0.0001
FCBBACGCDBBBBBBBHHABBB	0.0005
FCBBACGCDBBBBDDBHHABBB	0.0002
FCBBACGCDBBCBBBBHHABBB	0.0013
FCBBACGCDBBCBBBBHHBBBB	0.0002
FCBBACGCDBBCBDDBHHABBB	0.0006
FCBBACGCDBBCBDDBHHBBBB	0.0001
FCBBACGCFBBBCBBBHHABBB	0.0003
FCBBACGCFBBBCDDBHHABBB	0.0001
FCBBACGCFBBCCBBBHHABBB	0.0009
FCBBACGCFBBCCBBBHHBBBB	0.0002
FCBBACGCFBBCCDDBHHABBB	0.0004
FCBBACGCFBBCCDDBHHBBBB	0.0001
FCBBACGEFBBBCABBEGABBB	0.0001
FCBBACGEFBBCCABBEGABBB	0.0005
FCBBACGEFBBCCABBEGBBBB	0.0001
FCBBACGEFBBCCADBEGABBB	0.0001
FCBBACGGDBBBBABBEGABBB	0.0002
FCBBACGGDBBBBADBEGABBB	0.0001
FCBBACGGDBBCBABBEGABBB	0.0008
FCBBACGGDBBCBABBEGBBBB	0.0001
FCBBACGGDBBCBADBEGABBB	0.0005
FCBBACGGDBBCBADBEGBBBB	0.0001
FCCBAAGCFBBACBBBHHABBB	0.0002
FCCBAAGCFBBACDDBHHABBB	0.0001
FCCBAAGCFBBBCBBBHHABBB	0.0017
FCCBAAGCFBBBCDDBHHABBB	0.0005
FCCBAAGCFBBCCBBBHHABBB	0.0051
FCCBAAGCFBBCCDDBHHABBB	0.0015

206

```
CONSEQUENCE MEASURE:
 POP. DOSE 50 MI.


 BASE CASE :
  PEACH BOTTOM LLH (MACCS)

 FRACTIONAL CONTRIBUTIONS OF EACH RELEASE TO MEAN RISK
                  RELEASE                CONTRIBUTION
                  PCH  1D                   0.0001
                  PCH  2D                   0.0026
                  PCH  3D                   0.0187
                  PCH  4D                   0.0424
                  PCH  5D                   0.0978
                  PCH  6D                   0.1177
                  PCH  7D                   0.2343
                  PCH  8D                   0.2976
                  PCH  9D                   0.1544
                  PCH 10D                   0.0000
                  PCH 11D                   0.0000
                  PCH 12D                   0.0001
                  PCH 13D                   0.0000
                  PCH 14D                   0.0000
                  PCH 15D                   0.0003
                  PCH 16D                   0.0000
                  PCH 17D                   0.0000
                  PCH 18D                   0.0001
                  PCH 19D                   0.0003
                  PCH 20D                   0.0006
                  PCH 21D                   0.0008
                  PCH 22D                   0.0025
                  PCH 23D                   0.0013
                  PCH 24D                   0.0048
                  PCH 25D                   0.0000
                  PCH 26D                   0.0005
                  PCH 27D                   0.0006
                  PCH 28D                   0.0043
                  PCH 29D                   0.0016
                  PCH 30D                   0.0007
                  PCH 31D                   0.0027
                  PCH 32D                   0.0002
                  PCH 33D                   0.0016
                  PCH 34D                   0.0023
                  PCH 35D                   0.0000
                  PCH 36D                   0.0018
                  PCH 37D                   0.0008
                  PCH 38D                   0.0003
                  PCH 39D                   0.0007
                  PCH 40D                   0.0000
                  PCH 41D                   0.0014
                  PCH 42D                   0.0005
                  PCH 43D                   0.0003
                  PCH 44D                   0.0001
                  PCH 45D                   0.0005
                  PCH 46D                   0.0003
                  PCH 47D                   0.0007
                  PCH 48D                   0.0005
                  PCH 49D                   0.0000
                  PCH 50D                   0.0005
                  PCH 51D                   0.0001
                  PCH 52D                   0.0001
                  PCH 53D                   0.0000
                  PCH 54D                   0.0000
```

```
CONSEQUENCE MEASURE:
  POP. DOSE 50 MI.

  SENSITIVITY OF RISK TO ISSUES
  DISTRIBUTION OF RISK AT EACH LEVEL OF EACH ISSUE
  BASE CASE :
   PEACH BOTTOM LLH (MACCS)

GP ISS LVL NUM      5%           50%          MEAN         95%        R**2    F   DF       SIGNIF.
 1   1   1  15  0.5639E+01   0.1002E+02   0.3140E+02   0.1825E+03    0.01     0.7(  3,146)    0.55NS
         3  60  0.2634E+01   0.1158E+02   0.4387E+02   0.2045E+03
         2  60  0.1168E+01   0.1756E+02   0.5283E+02   0.2310E+03
         1  15  0.4022E+01   0.1792E+02   0.7543E+02   0.4558E+03
 1   2   1  15  0.1568E+01   0.6866E+01   0.9306E+01   0.2358E+02    0.44    38.4(  3,146)    0.00**
         2  60  0.1168E+01   0.8922E+01   0.1174E+02   0.2600E+02
         3  60  0.4632E+01   0.2628E+02   0.3093E+02   0.7359E+02
         4  15  0.8461E+02   0.2793E+03   0.3136E+03   0.6415E+03
 1   3   1  15  0.3656E+01   0.9443E+01   0.1480E+02   0.4372E+02    0.03     1.6(  3,146)    0.20NS
         2  60  0.1166E+01   0.1264E+02   0.4186E+02   0.1121E+03
         4  15  0.5756E+01   0.2504E+02   0.4561E+02   0.1745E+03
         3  60  0.2565E+01   0.1600E+02   0.6644E+02   0.3941E+03
 1   4   2  62  0.1817E+01   0.1264E+02   0.4675E+02   0.3055E+03    0.01     1.2(  1,148)    0.28NS
         1  88  0.3394E+01   0.1458E+02   0.5120E+02   0.2206E+03
 1   5   2  60  0.2820E+01   0.1033E+02   0.4340E+02   0.2045E+03    0.16     9.0(  3,146)    0.00**
         1  15  0.4889E+00   0.4404E+01   0.4532E+02   0.3305E+03
         3  60  0.3911E+01   0.1883E+02   0.5141E+02   0.2170E+03
         4  15  0.5556E+01   0.3390E+02   0.6908E+02   0.3058E+03
 2   1   1  15  0.3336E+01   0.1650E+02   0.2282E+02   0.7944E+02    0.00     0.0(  3,146)    0.99NS
         2  60  0.1814E+01   0.1780E+02   0.4114E+02   0.1576E+03
         3  60  0.3703E+01   0.1176E+02   0.5561E+02   0.3522E+03
         4  15  0.1505E+01   0.1299E+02   0.8378E+02   0.5508E+03
 2   2   3  60  0.1395E+01   0.1010E+02   0.2942E+02   0.8558E+02    0.05     2.3(  3,146)    0.08NS
         1  15  0.1568E+01   0.1299E+02   0.5842E+02   0.3530E+03
         2  60  0.2944E+01   0.1850E+02   0.5847E+02   0.3073E+03
         4  15  0.2613E+01   0.1615E+02   0.8363E+02   0.5386E+03
 2   3   1  15  0.3882E+01   0.1056E+02   0.4546E+02   0.2833E+03    0.00     0.1(  3,146)    0.94NS
         2  60  0.3188E+01   0.1502E+02   0.4703E+02   0.2045E+03
         3  60  0.1168E+01   0.1438E+02   0.4804E+02   0.3073E+03
         4  15  0.3554E+01   0.1615E+02   0.6788E+02   0.4106E+03
 2   4   4  15  0.7023E+00   0.9443E+01   0.1507E+02   0.4505E+02    0.01     0.7(  3,146)    0.55NS
         1  15  0.2351E+01   0.1845E+02   0.2133E+02   0.5381E+02
         2  60  0.3338E+01   0.1382E+02   0.5488E+02   0.3438E+03
         3  60  0.1748E+01   0.1555E+02   0.5943E+02   0.3522E+03
 2   5   2  24  0.5794E+01   0.1032E+02   0.4497E+02   0.1757E+03    0.00     0.2(  1,148)    0.63NS
         1 126  0.1915E+01   0.1415E+02   0.5020E+02   0.2901E+03
 2   6   2  11  0.5937E+01   0.1230E+02   0.1486E+02   0.4756E+02    0.03     0.6(  8,141)    0.78NS
         1   2*************************   0.1617E+02************
         4   9  0.4404E+01   0.1354E+02   0.1664E+02   0.3491E+02
         8  16  0.1374E+01   0.1210E+02   0.2053E+02   0.9270E+02
         7  20  0.2465E+01   0.1762E+02   0.2825E+02   0.7708E+02
         9  12  0.2768E+01   0.1095E+02   0.4585E+02   0.2469E+03
         5  22  0.2329E+01   0.1341E+02   0.6648E+02   0.4403E+03
         3  20  0.2617E+01   0.2376E+02   0.6779E+02   0.3239E+03
         6  38  0.1605E+01   0.1308E+02   0.7359E+02   0.4757E+03
 2   7   2  94  0.2742E+01   0.1378E+02   0.3987E+02   0.1791E+03    0.02     1.3(  2,147)    0.28NS
         3  51  0.1189E+01   0.1319E+02   0.6228E+02   0.4769E+03
         1   5  0.9303E+01   0.5098E+02   0.9606E+02   0.3496E+03
 2   8   1  15  0.1324E+01   0.2455E+02   0.2673E+02   0.5673E+02    0.00     0.1(  1,148)    0.70NS
         2 135  0.2716E+01   0.1403E+02   0.5188E+02   0.3223E+03
 2   9   2  75  0.1271E+01   0.1418E+02   0.4653E+02   0.2074E+03    0.00     0.3(  1,148)    0.61NS
         1  75  0.3782E+01   0.1403E+02   0.5219E+02   0.3305E+03
 2  10   2  75  0.2209E+01   0.1412E+02   0.2990E+02   0.1132E+03    0.00     0.2(  1,148)    0.63NS
         1  75  0.2607E+01   0.1403E+02   0.6882E+02   0.4839E+03
 2  11   1  16  0.5159E+00   0.5710E+01   0.1982E+02   0.7049E+02    0.04     1.9(  3,146)    0.13NS
         4   4*************************   0.2069E+02************
         2  80  0.3259E+01   0.1438E+02   0.4975E+02   0.3125E+03
         3  50  0.1985E+01   0.1603E+02   0.6048E+02   0.3381E+03
 2  12   2  45  0.1154E+01   0.1332E+02   0.3714E+02   0.8485E+02    0.04     1.5(  4,145)    0.21NS
         3  38  0.4615E+01   0.1073E+02   0.4017E+02   0.1835E+03
         4  22  0.2342E+01   0.2221E+02   0.5332E+02   0.2215E+03
         1  30  0.2604E+01   0.1301E+02   0.5975E+02   0.3496E+03
         5  15  0.1881E+01   0.3491E+02   0.8271E+02   0.4193E+03
 2  13   2  75  0.2127E+01   0.1090E+02   0.4182E+02   0.1745E+03    0.03     2.0(  2,147)    0.14NS
         1  60  0.3303E+01   0.1633E+02   0.4615E+02   0.2424E+03
         3  15  0.1768E+01   0.1591E+02   0.9988E+02   0.6156E+03
 2  14   2  75  0.1280E+01   0.8877E+01   0.3446E+02   0.1529E+03    0.15    26.4(  1,148)    0.00**
         1  75  0.4291E+01   0.2504E+02   0.6426E+02   0.3305E+03
 2  15   1  60  0.2702E+01   0.1603E+02   0.4181E+02   0.9488E+02    0.00     0.4(  1,148)    0.55NS
         2  90  0.2604E+01   0.1298E+02   0.5439E+02   0.3381E+03
 2  16   2  75  0.2716E+01   0.1319E+02   0.4065E+02   0.1876E+03    0.00     0.0(  1,148)    1.00NS
         1  75  0.2125E+01   0.1418E+02   0.5807E+02   0.4184E+03
 2  17   2 120  0.2274E+01   0.1312E+02   0.4626E+02   0.2424E+03    0.01     2.1(  1,148)    0.15NS
         1  30  0.3314E+01   0.2288E+02   0.6175E+02   0.4443E+03
 3   1   4   3*************************   0.1386E+02************    0.02     1.2(  3,146)    0.30NS
         2  74  0.2096E+01   0.1250E+02   0.3565E+02   0.1898E+03
         3  39  0.3814E+01   0.1947E+02   0.5977E+02   0.4183E+03
```

```
           1  34  0.1378E+01  0.1412E+02  0.7039E+02  0.5544E+03
 3    2    4  15  0.3514E+01  0.9192E+01  0.2045E+02  0.5655E+02    0.02     0.7(  3,146)    0.52NS
           3  51  0.3502E+01  0.1304E+02  0.2792E+02  0.8921E+02
           1  29  0.2499E+01  0.1332E+02  0.3415E+02  0.1442E+03
           2  55  0.1339E+01  0.1780E+02  0.8515E+02  0.5201E+03
 3    3    1  14  0.1480E+01  0.9233E+01  0.1898E+02  0.7070E+02    0.02     0.8(  4,145)    0.51NS
           5   7  0.1163E+01  0.1299E+02  0.3084E+02  0.1393E+03
           4  35  0.2127E+01  0.9778E+01  0.4554E+02  0.2602E+03
           3  36  0.3986E+01  0.1481E+02  0.4914E+02  0.2525E+03
           2  58  0.1986E+01  0.1793E+02  0.6137E+02  0.3983E+03
 3    4    1  15  0.4524E+01  0.1403E+02  0.1596E+02  0.3611E+02    0.01     0.4(  4,145)    0.84NS
           5   5  0.2615E+01  0.1299E+02  0.1600E+02  0.4237E+02
           3  30  0.3664E+01  0.1329E+02  0.4437E+02  0.2793E+03
           2  76  0.1750E+01  0.1374E+02  0.5624E+02  0.3461E+03
           4  24  0.2045E+01  0.2542E+02  0.6165E+02  0.2799E+03
 3    5    1   4************************  0.1351E+02************    0.02     0.7(  4,145)    0.62NS
           3  46  0.2693E+01  0.1408E+02  0.3227E+02  0.1221E+03
           2  35  0.2836E+01  0.1319E+02  0.4945E+02  0.3467E+03
           4  50  0.1157E+01  0.1591E+02  0.6022E+02  0.4443E+03
           5  15  0.6807E+01  0.1497E+02  0.7490E+02  0.4892E+03
 3    6    1   4************************  0.1339E+02************    0.00     0.2(  3,146)    0.88NS
           4  23  0.4639E+01  0.1650E+02  0.3388E+02  0.1119E+03
           2  47  0.1932E+01  0.1124E+02  0.4511E+02  0.1546E+03
           3  76  0.1481E+01  0.1382E+02  0.5857E+02  0.4093E+03
 3    7    1  18  0.1167E+01  0.9798E+01  0.2756E+02  0.1392E+03    0.02     1.0(  3,146)    0.38NS
           3  55  0.3535E+01  0.1299E+02  0.4560E+02  0.1281E+03
           2  62  0.1847E+01  0.1481E+02  0.4833E+02  0.3015E+03
           4  15  0.4330E+01  0.2255E+02  0.9358E+02  0.5386E+03
 3    8    1  25  0.1170E+01  0.1056E+02  0.1516E+02  0.5755E+02    0.06     3.3(  3,146)    0.02 *
           2  58  0.1340E+01  0.1309E+02  0.4577E+02  0.2056E+03
           3  52  0.6354E+01  0.1679E+02  0.6325E+02  0.4699E+03
           4  15  0.4216E+01  0.1845E+02  0.7211E+02  0.4149E+03
 3    9    1  12  0.2040E+01  0.1129E+02  0.1659E+02  0.5209E+02    0.02     0.8(  3,146)    0.51NS
           2  27  0.2491E+01  0.1497E+02  0.2430E+02  0.7505E+02
           4  54  0.1165E+01  0.1326E+02  0.3576E+02  0.9778E+02
           3  57  0.4335E+01  0.1354E+02  0.8102E+02  0.5171E+03
 3   10    1   7  0.1143E+01  0.8877E+01  0.1708E+02  0.6060E+02    0.01     0.7(  3,146)    0.56NS
           2  49  0.1933E+01  0.1403E+02  0.3224E+02  0.9279E+02
           3  73  0.2606E+01  0.1418E+02  0.4800E+02  0.2654E+03
           4  21  0.4787E+01  0.1768E+02  0.1048E+03  0.5788E+03
 3   11    1  75  0.3107E+01  0.1403E+02  0.4196E+02  0.1132E+03    0.00     0.0(  1,148)    1.00NS
           2  75  0.1280E+01  0.1412E+02  0.5676E+02  0.3467E+03
 3   12    2  50  0.1174E+01  0.1301E+02  0.2427E+02  0.6342E+02    0.03     1.9(  2,147)    0.15NS
           3  50  0.3314E+01  0.1408E+02  0.5141E+02  0.2793E+03
           1  50  0.4620E+01  0.1612E+02  0.7240E+02  0.4979E+03
 3   13    4  37  0.1942E+01  0.1418E+02  0.3030E+02  0.1315E+03    0.01     0.7(  3,146)    0.54NS
           1  38  0.1608E+01  0.1283E+02  0.3074E+02  0.1400E+03
           3  38  0.3916E+01  0.1697E+02  0.6782E+02  0.4757E+03
           2  37  0.1411E+01  0.1609E+02  0.6859E+02  0.4700E+03
 3   14    3  30  0.1157E+01  0.1382E+02  0.3435E+02  0.1181E+03    0.00     0.0(  4,145)    1.00NS
           4  30  0.3664E+01  0.1522E+02  0.3873E+02  0.1578E+03
           5  30  0.1163E+01  0.1097E+02  0.5500E+02  0.3496E+03
           2  30  0.3494E+01  0.1458E+02  0.5578E+02  0.4443E+03
           1  30  0.1985E+01  0.1543E+02  0.6295E+02  0.6221E+03
NS=NOT SIGNIFICANT, *=SIGNIFICANT (P<.05), **=SIGNIFICANT (P<.01)
```

```
        CONSEQUENCE MEASURE:  POP. DOSE 50 MI.
   0    ISSUE GROUP =   1   ISSUE =   1   SLC FAILURE TO ACTUATE

        LEVEL 1 NO.<MED.=  9 NO. EXP.=  7     NO.>=MED.=  6 NO. EXP.=  8   CHI-SQ.=   1.1 DF= 1 SIG.= 0.301
        LEVEL 2 NO.<MED.= 27 NO. EXP.= 30     NO.>=MED.= 33 NO. EXP.= 30   CHI-SQ.=   0.6 DF= 1 SIG.= 0.439
        LEVEL 3 NO.<MED.= 33 NO. EXP.= 30     NO.>=MED.= 27 NO. EXP.= 30   CHI-SQ.=   0.6 DF= 1 SIG.= 0.439
        LEVEL 4 NO.<MED.=  5 NO. EXP.=  7     NO.>=MED.= 10 NO. EXP.=  8   CHI-SQ.=   1.1 DF= 1 SIG.= 0.301
        OVERALL CHI-SQ=   3.3 DF=  7  SIG.= 0.852

   0    ISSUE GROUP =   1   ISSUE =   2   DC COMMON MODE

        LEVEL 1 NO.<MED.= 12 NO. EXP.=  7     NO.>=MED.=  3 NO. EXP.=  8   CHI-SQ.=   6.7 DF= 1 SIG.= 0.010
        LEVEL 2 NO.<MED.= 42 NO. EXP.= 30     NO.>=MED.= 18 NO. EXP.= 30   CHI-SQ.=   9.6 DF= 1 SIG.= 0.002
        LEVEL 3 NO.<MED.= 20 NO. EXP.= 30     NO.>=MED.= 40 NO. EXP.= 30   CHI-SQ.=   6.7 DF= 1 SIG.= 0.010
        LEVEL 4 NO.<MED.=  0 NO. EXP.=  7     NO.>=MED.= 15 NO. EXP.=  8   CHI-SQ.=  13.1 DF= 1 SIG.= 0.000
        OVERALL CHI-SQ=  36.1 DF=  7  SIG.= 0.000

   0    ISSUE GROUP =   1   ISSUE =   3   FAILURE TO VENT

        LEVEL 1 NO.<MED.= 10 NO. EXP.=  7     NO.>=MED.=  5 NO. EXP.=  8   CHI-SQ.=   2.4 DF= 1 SIG.= 0.120
        LEVEL 2 NO.<MED.= 33 NO. EXP.= 30     NO.>=MED.= 27 NO. EXP.= 30   CHI-SQ.=   0.6 DF= 1 SIG.= 0.439
        LEVEL 3 NO.<MED.= 26 NO. EXP.= 30     NO.>=MED.= 34 NO. EXP.= 30   CHI-SQ.=   1.1 DF= 1 SIG.= 0.302
        LEVEL 4 NO.<MED.=  5 NO. EXP.=  7     NO.>=MED.= 10 NO. EXP.=  8   CHI-SQ.=   1.1 DF= 1 SIG.= 0.301
        OVERALL CHI-SQ=   5.1 DF=  7  SIG.= 0.642

   0    ISSUE GROUP =   1   ISSUE =   4   SW MOD A VS. MOD B

        LEVEL 1 NO.<MED.= 41 NO. EXP.= 44     NO.>=MED.= 47 NO. EXP.= 44   CHI-SQ.=   0.4 DF= 1 SIG.= 0.522
        LEVEL 2 NO.<MED.= 33 NO. EXP.= 31     NO.>=MED.= 29 NO. EXP.= 31   CHI-SQ.=   0.3 DF= 1 SIG.= 0.611
        OVERALL CHI-SQ=   0.7 DF=  3  SIG.= 0.881

   0    ISSUE GROUP =   1   ISSUE =   5   POWER RECOVERY

        LEVEL 1 NO.<MED.= 13 NO. EXP.=  7     NO.>=MED.=  2 NO. EXP.=  8   CHI-SQ.=   9.6 DF= 1 SIG.= 0.002
        LEVEL 2 NO.<MED.= 34 NO. EXP.= 30     NO.>=MED.= 26 NO. EXP.= 30   CHI-SQ.=   1.1 DF= 1 SIG.= 0.302
        LEVEL 3 NO.<MED.= 23 NO. EXP.= 30     NO.>=MED.= 37 NO. EXP.= 30   CHI-SQ.=   3.3 DF= 1 SIG.= 0.071
        LEVEL 4 NO.<MED.=  4 NO. EXP.=  7     NO.>=MED.= 11 NO. EXP.=  8   CHI-SQ.=   2.4 DF= 1 SIG.= 0.120
        OVERALL CHI-SQ=  16.4 DF=  7  SIG.= 0.022

   0    ISSUE GROUP =   2   ISSUE =   1   PROB. OF STUCK OPEN VAC. BRKR.

        LEVEL 1 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
        LEVEL 2 NO.<MED.= 26 NO. EXP.= 30     NO.>=MED.= 34 NO. EXP.= 30   CHI-SQ.=   1.1 DF= 1 SIG.= 0.302
        LEVEL 3 NO.<MED.= 33 NO. EXP.= 30     NO.>=MED.= 27 NO. EXP.= 30   CHI-SQ.=   0.6 DF= 1 SIG.= 0.439
        LEVEL 4 NO.<MED.=  9 NO. EXP.=  7     NO.>=MED.=  6 NO. EXP.=  8   CHI-SQ.=   1.1 DF= 1 SIG.= 0.301
        OVERALL CHI-SQ=   3.0 DF=  7  SIG.= 0.884

   0    ISSUE GROUP =   2   ISSUE =   2   HPSW-SPRAY

        LEVEL 1 NO.<MED.   8 NO. EXP.=  7     NO.>=MED.=  7 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
```

210

```
     LEVEL 2 NO.<MED.= 23 NO. EXP.= 30     NO.>=MED.= 37 NO. EXP.= 30   CHI-SQ.=   3.3 DF= 1 SIG.= 0.071
     LEVEL 3 NO.<MED.= 36 NO. EXP.= 30     NO.>=MED.= 24 NO. EXP.= 30   CHI-SQ.=   2.4 DF= 1 SIG.= 0.121
     LEVEL 4 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   5.9 DF=  7  SIG.= 0.547

0    ISSUE GROUP =   2   ISSUE =   3   VENT-SBO-NACR

     LEVEL 1 NO.<MED.= 10 NO. EXP.=  7     NO.>=MED.=  5 NO. EXP.=  8   CHI-SQ.=   2.4 DF= 1 SIG.= 0.120
     LEVEL 2 NO.<MED.= 29 NO. EXP.= 30     NO.>=MED.= 31 NO. EXP.= 30   CHI-SQ.=   0.1 DF= 1 SIG.= 0.796
     LEVEL 3 NO.<MED.= 28 NO. EXP.= 30     NO.>=MED.= 32 NO. EXP.= 30   CHI-SQ.=   0.3 DF= 1 SIG.= 0.606
     LEVEL 4 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   2.7 DF=  7  SIG.= 0.908

0    ISSUE GROUP =   2   ISSUE =   4   VENT-SBO-ACR

     LEVEL 1 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
     LEVEL 2 NO.<MED.= 30 NO. EXP.= 30     NO.>=MED.= 30 NO. EXP.= 30   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 3 NO.<MED.= 28 NO. EXP.= 30     NO.>=MED.= 32 NO. EXP.= 30   CHI-SQ.=   0.3 DF= 1 SIG.= 0.606
     LEVEL 4 NO.<MED.= 10 NO. EXP.=  7     NO.>=MED.=  5 NO. EXP.=  8   CHI-SQ.=   2.4 DF= 1 SIG.= 0.120
     OVERALL CHI-SQ=   2.9 DF=  7  SIG.= 0.890

0    ISSUE GROUP =   2   ISSUE =   5   SP BYPASS, SMALL/LARGE

     LEVEL 1 NO.<MED.= 61 NO. EXP.= 63     NO.>=MED.= 65 NO. EXP.= 63   CHI-SQ.=   0.1 DF= 1 SIG.= 0.722
     LEVEL 2 NO.<MED.= 13 NO. EXP.= 12     NO.>=MED.= 11 NO. EXP.= 12   CHI-SQ.=   0.2 DF= 1 SIG.= 0.683
     OVERALL CHI-SQ=   0.3 DF=  3  SIG.= 0.961

0    ISSUE GROUP =   2   ISSUE =   6   CONT FAILURE PRESS. (T<500P B VB)

     LEVEL 1 NO.<MED.=  1 NO. EXP.=  1     NO.>=MED.=  1 NO. EXP.=  1    TEST CANNOT BE RUN; EXP. NO. < 3
     LEVEL 2 NO.<MED.=  7 NO. EXP.=  5     NO.>=MED.=  4 NO. EXP.=  6   CHI-SQ.=   1.5 DF= 1 SIG.= 0.226
     LEVEL 3 NO.<MED.=  6 NO. EXP.= 10     NO.>=MED.= 14 NO. EXP.= 10   CHI-SQ.=   3.2 DF= 1 SIG.= 0.074
     LEVEL 4 NO.<MED.=  5 NO. EXP.=  4     NO.>=MED.=  4 NO. EXP.=  5   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 5 NO.<MED.= 11 NO. EXP.= 11     NO.>=MED.= 11 NO. EXP.= 11   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 6 NO.<MED.= 21 NO. EXP.= 19     NO.>=MED.= 17 NO. EXP.= 19   CHI-SQ.=   0.4 DF= 1 SIG.= 0.516
     LEVEL 7 NO.<MED.=  8 NO. EXP.= 10     NO.>=MED.= 12 NO. EXP.= 10   CHI-SQ.=   0.8 DF= 1 SIG.= 0.371
     LEVEL 8 NO.<MED.=  8 NO. EXP.=  8     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 9 NO.<MED.=  7 NO. EXP.=  6     NO.>=MED.=  5 NO. EXP.=  6   CHI-SQ.=   0.3 DF= 1 SIG.= 0.564
     OVERALL CHI-SQ=   6.2 DF= 15  SIG.= 0.976

0    ISSUE GROUP =   2   ISSUE =   7   LATE FAILURE LOCATION (800-1200 A VB)

     LEVEL 1 NO.<MED.=  1 NO. EXP.=  2     NO.>=MED.=  4 NO. EXP.=  3    TEST CANNOT BE RUN; EXP. NO. < 3
     LEVEL 2 NO.<MED.= 47 NO. EXP.= 47     NO.>=MED.= 47 NO. EXP.= 47   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 3 NO.<MED.= 26 NO. EXP.= 25     NO.>=MED.= 25 NO. EXP.= 26   CHI-SQ.=   0.1 DF= 1 SIG.= 0.779
     OVERALL CHI-SQ=   0.1 DF=  3  SIG.= 0.994

0    ISSUE GROUP =   2   ISSUE =   8   CONT FAILURE SIZE, RAPID PRESS.
```

```
     LEVEL 1 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 2 NO.<MED.= 67 NO. EXP.= 67     NO.>=MED.= 68 NO. EXP.= 68   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   0.0 DF=  3  SIG.= 1.000

0    ISSUE GROUP =   2   ISSUE =   9   CONT FAILURE SIZE, SLOW PRESS.

     LEVEL 1 NO.<MED.= 37 NO. EXP.= 37     NO.>=MED.= 38 NO. EXP.= 38   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 2 NO.<MED.= 37 NO. EXP.= 37     NO.>=MED.= 38 NO. EXP.= 38   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   0.0 DF=  3  SIG.= 1.000

0    ISSUE GROUP =   2   ISSUE =  10   VB MODE, HIGH-P FLOW MELT

     LEVEL 1 NO.<MED.= 37 NO. EXP.= 37     NO.>=MED.= 38 NO. EXP.= 38   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 2 NO.<MED.= 37 NO. EXP.= 37     NO.>=MED.= 38 NO. EXP.= 38   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   0.0 DF=  3  SIG.= 1.000

0    ISSUE GROUP =   2   ISSUE =  11   CONT PRESS. BEFORE VB, LONG TERM TB

     LEVEL 1 NO.<MED.= 10 NO. EXP.=  8     NO.>=MED.=  6 NO. EXP.=  8   CHI-SQ.=   1.0 DF= 1 SIG.= 0.317
     LEVEL 2 NO.<MED.= 38 NO. EXP.= 40     NO.>=MED.= 42 NO. EXP.= 40   CHI-SQ.=   0.2 DF= 1 SIG.= 0.655
     LEVEL 3 NO.<MED.= 23 NO. EXP.= 25     NO.>=MED.= 27 NO. EXP.= 25   CHI-SQ.=   0.3 DF= 1 SIG.= 0.572
     LEVEL 4 NO.<MED.=  3 NO. EXP.=  2     NO.>=MED.=  1 NO. EXP.=  2    TEST CANNOT BE RUN; EXP. NO. < 3
     OVERALL CHI-SQ=   1.5 DF=  5  SIG.= 0.911

0    ISSUE GROUP =   2   ISSUE =  12   PRESSURE RISE AT VB

     LEVEL 1 NO.<MED.= 16 NO. EXP.= 15     NO.>=MED.= 14 NO. EXP.= 15   CHI-SQ.=   0.1 DF= 1 SIG.= 0.715
     LEVEL 2 NO.<MED.= 24 NO. EXP.= 22     NO.>=MED.= 21 NO. EXP.= 23   CHI-SQ.=   0.4 DF= 1 SIG.= 0.551
     LEVEL 3 NO.<MED.= 20 NO. EXP.= 19     NO.>=MED.= 18 NO. EXP.= 19   CHI-SQ.=   0.1 DF= 1 SIG.= 0.746
     LEVEL 4 NO.<MED.=  8 NO. EXP.= 11     NO.>=MED.= 14 NO. EXP.= 11   CHI-SQ.=   1.6 DF= 1 SIG.= 0.201
     LEVEL 5 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
     OVERALL CHI-SQ=   2.5 DF=  9  SIG.= 0.981

0    ISSUE GROUP =   2   ISSUE =  13   DELTA P DUE TO SUMP WATER INTERACT.

     LEVEL 1 NO.<MED.= 26 NO. EXP.= 30     NO.>=MED.= 34 NO. EXP.= 30   CHI-SQ.=   1.1 DF= 1 SIG.= 0.302
     LEVEL 2 NO.<MED.= 42 NO. EXP.= 37     NO.>=MED.= 33 NO. EXP.= 38   CHI-SQ.=   1.3 DF= 1 SIG.= 0.248
     LEVEL 3 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
     OVERALL CHI-SQ=   2.7 DF=  5  SIG.= 0.751

0    ISSUE GROUP =   2   ISSUE =  14   PROB OF DRY DW MELT THROUGH

     LEVEL 1 NO.<MED.= 23 NO. EXP.= 37     NO.>=MED.= 52 NO. EXP.= 38   CHI-SQ.=  10.5 DF= 1 SIG.= 0.001
     LEVEL 2 NO.<MED.= 51 NO. EXP.= 37     NO.>=MED.= 24 NO. EXP.= 38   CHI-SQ.=  10.5 DF= 1 SIG.= 0.001
     OVERALL CHI-SQ=  20.9 DF=  3  SIG.= 0.000

0    ISSUE GROUP =   2   ISSUE =  15   PROB OF WET DW MELT THROUGH

     LEVEL 1 NO.<MED.= 27 NO. EXP.= 30     NO.>=MED.= 33 NO. EXP.= 30   CHI-SQ.=   0.6 DF= 1 SIG.= 0.439
     LEVEL 2 NO.<MED.= 47 NO. EXP.= 45     NO.>=MED.= 43 NO. EXP.= 45   CHI-SQ.=   0.2 DF= 1 SIG.= 0.673
```

```
      OVERALL CHI-SQ=   0.8 DF=  3  SIG.= 0.855

0     ISSUE GROUP =   2   ISSUE =  16   PROB OF DW M-THRU W/HI-P MELT EJECT

      LEVEL 1 NO.<MED.= 36 NO. EXP.= 37     NO.>=MED.= 39 NO. EXP.= 38   CHI-SQ.=   0.1 DF= 1 SIG.= 0.817
      LEVEL 2 NO.<MED.= 38 NO. EXP.= 37     NO.>=MED.= 37 NO. EXP.= 38   CHI-SQ.=   0.1 DF= 1 SIG.= 0.817
      OVERALL CHI-SQ=   0.1 DF=  3  SIG.= 0.991

0     ISSUE GROUP =   2   ISSUE =  17   PROB OF H2 BURNS IN RB LEADING TO BP

      LEVEL 1 NO.<MED.= 11 NO. EXP.= 15     NO.>=MED.= 19 NO. EXP.= 15   CHI-SQ.=   2.1 DF= 1 SIG.= 0.144
      LEVEL 2 NO.<MED.= 63 NO. EXP.= 60     NO.>=MED.= 57 NO. EXP.= 60   CHI-SQ.=   0.3 DF= 1 SIG.= 0.584
      OVERALL CHI-SQ=   2.4 DF=  3  SIG.= 0.487

0     ISSUE GROUP =   3   ISSUE =   1   IN-VES RELEASE FROM FUEL

      LEVEL 1 NO.<MED.= 17 NO. EXP.= 17     NO.>=MED.= 17 NO. EXP.= 17   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
      LEVEL 2 NO.<MED.= 40 NO. EXP.= 37     NO.>=MED.= 34 NO. EXP.= 37   CHI-SQ.=   0.5 DF= 1 SIG.= 0.486
      LEVEL 3 NO.<MED.= 16 NO. EXP.= 19     NO.>=MED.= 23 NO. EXP.= 20   CHI-SQ.=   0.9 DF= 1 SIG.= 0.336
      LEVEL 4 NO.<MED.=  1 NO. EXP.=  1     NO.>=MED.=  2 NO. EXP.=  2    TEST CANNOT BE RUN; EXP. NO. < 3
      OVERALL CHI-SQ=   1.4 DF=  5  SIG.= 0.923

0     ISSUE GROUP =   3   ISSUE =   2   CSI DECOMP

      LEVEL 1 NO.<MED.= 15 NO. EXP.= 14     NO.>=MED.= 14 NO. EXP.= 15   CHI-SQ.=   0.1 DF= 1 SIG.= 0.710
      LEVEL 2 NO.<MED.= 23 NO. EXP.= 27     NO.>=MED.= 32 NO. EXP.= 28   CHI-SQ.=   1.2 DF= 1 SIG.= 0.281
      LEVEL 3 NO.<MED.= 27 NO. EXP.= 25     NO.>=MED.= 24 NO. EXP.= 26   CHI-SQ.=   0.3 DF= 1 SIG.= 0.575
      LEVEL 4 NO.<MED.=  9 NO. EXP.=  7     NO.>=MED.=  6 NO. EXP.=  8   CHI-SQ.=   1.1 DF= 1 SIG.= 0.301
      OVERALL CHI-SQ=   2.7 DF=  7  SIG.= 0.912

0     ISSUE GROUP =   3   ISSUE =   3   FRAC IN-VES RETENTION LEAKED, AT VB

      LEVEL 1 NO.<MED.=  9 NO. EXP.=  7     NO.>=MED.=  5 NO. EXP.=  7   CHI-SQ.=   1.1 DF= 1 SIG.= 0.285
      LEVEL 2 NO.<MED.= 25 NO. EXP.= 29     NO.>=MED.= 33 NO. EXP.= 29   CHI-SQ.=   1.1 DF= 1 SIG.= 0.293
      LEVEL 3 NO.<MED.= 16 NO. EXP.= 18     NO.>=MED.= 20 NO. EXP.= 18   CHI-SQ.=   0.4 DF= 1 SIG.= 0.505
      LEVEL 4 NO.<MED.= 20 NO. EXP.= 17     NO.>=MED.= 15 NO. EXP.= 18   CHI-SQ.=   1.0 DF= 1 SIG.= 0.310
      LEVEL 5 NO.<MED.=  4 NO. EXP.=  3     NO.>=MED.=  3 NO. EXP.=  4   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
      OVERALL CHI-SQ=   3.7 DF=  9  SIG.= 0.929

0     ISSUE GROUP =   3   ISSUE =   4   S POOL DF

      LEVEL 1 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
      LEVEL 2 NO.<MED.= 38 NO. EXP.= 38     NO.>=MED.= 38 NO. EXP.= 38   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
      LEVEL 3 NO.<MED.= 16 NO. EXP.= 15     NO.>=MED.= 14 NO. EXP.= 15   CHI-SQ.=   0.1 DF= 1 SIG.= 0.715
      LEVEL 4 NO.<MED.= 10 NO. EXP.= 12     NO.>=MED.= 14 NO. EXP.= 12   CHI-SQ.=   0.7 DF= 1 SIG.= 0.414
      LEVEL 5 NO.<MED.=  3 NO. EXP.=  2     NO.>=MED.=  2 NO. EXP.=  3    TEST CANNOT BE RUN; EXP. NO. < 3
      OVERALL CHI-SQ=   0.8 DF=  7  SIG.= 0.997

0     ISSUE GROUP =   3   ISSUE =   5   S POOL DF, VOL I
```

```
        LEVEL 1 NO.<MED.=  2 NO. EXP.=  2     NO.>=MED.=  2 NO. EXP.=  2    TEST CANNOT BE RUN; EXP. NO. < 3
        LEVEL 2 NO.<MED.= 19 NO. EXP.= 17     NO.>=MED.= 16 NO. EXP.= 18   CHI-SQ.=   0.5 DF= 1 SIG.= 0.499
        LEVEL 3 NO.<MED.= 23 NO. EXP.= 23     NO.>=MED.= 23 NO. EXP.= 23   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
        LEVEL 4 NO.<MED.= 23 NO. EXP.= 25     NO.>=MED.= 27 NO. EXP.= 25   CHI-SQ.=   0.3 DF= 1 SIG.= 0.572
        LEVEL 5 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
        OVERALL CHI-SQ=   0.8 DF=  7  SIG.= 0.998

 0      ISSUE GROUP =   3   ISSUE =   6   REVOL FROM RPV (FRVOL)

        LEVEL 1 NO.<MED.=  3 NO. EXP.=  2     NO.>=MED.=  1 NO. EXP.=  2    TEST CANNOT BE RUN; EXP. NO. < 3
        LEVEL 2 NO.<MED.= 24 NO. EXP.= 23     NO.>=MED.= 23 NO. EXP.= 24   CHI-SQ.=   0.1 DF= 1 SIG.= 0.770
        LEVEL 3 NO.<MED.= 38 NO. EXP.= 38     NO.>=MED.= 38 NO. EXP.= 38   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
        LEVEL 4 NO.<MED.=  9 NO. EXP.= 11     NO.>=MED.= 14 NO. EXP.= 12   CHI-SQ.=   0.7 DF= 1 SIG.= 0.404
        OVERALL CHI-SQ=   0.8 DF=  5  SIG.= 0.978

 0      ISSUE GPOUP =   3   ISSUE =   7   CCI REL

        LEVEL 1 NO.<MED.= 11 NO. EXP.=  9     NO.>=MED.=  7 NO. EXP.=  9   CHI-SQ.=   0.9 DF= 1 SIG.= 0.346
        LEVEL 2 NO.<MED.= 29 NO. EXP.= 31     NO.>=MED.= 33 NO. EXP.= 31   CHI-SQ.=   0.3 DF= 1 SIG.= 0.611
        LEVEL 3 NO.<MED.= 28 NO. EXP.= 27     NO.>=MED.= 27 NO. EXP.= 28   CHI-SQ.=   0.1 DF= 1 SIG.= 0.787
        LEVEL 4 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
        OVERALL CHI-SQ=   1.5 DF=  7  SIG.= 0.983

 0      ISSUE GROUP =   3   ISSUE =   8   RB DF

        LEVEL 1 NO.<MED.= 18 NO. EXP.= 12     NO.>=MED.=  7 NO. EXP.= 13   CHI-SQ.=   5.8 DF= 1 SIG.= 0.016
        LEVEL 2 NO.<MED.= 30 NO. EXP.= 29     NO.>=MED.= 28 NO. EXP.= 29   CHI-SQ.=   0.1 DF= 1 SIG.= 0.793
        LEVEL 3 NO.<MED.= 20 NO. EXP.= 26     NO.>=MED.= 32 NO. EXP.= 26   CHI-SQ.=   2.8 DF= 1 SIG.= 0.096
        LEVEL 4 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
        OVERALL CHI-SQ=   8.9 DF=  7  SIG.= 0.262

 0      ISSUE GROUP =   3   ISSUE =   9   REF BAY DF

        LEVEL 1 NO.<MED.=  6 NO. EXP.=  6     NO.>=MED.=  6 NO. EXP.=  6   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
        LEVEL 2 NO.<MED.= 11 NO. EXP.= 13     NO.>=MED.= 16 NO. EXP.= 14   CHI-SQ.=   0.6 DF= 1 SIG.= 0.441
        LEVEL 3 NO.<MED.= 29 NO. EXP.= 28     NO.>=MED.= 28 NO. EXP.= 29   CHI-SQ.=   0.1 DF= 1 SIG.= 0.791
        LEVEL 4 NO.<MED.= 28 NO. EXP.= 27     NO.>=MED.= 26 NO. EXP.= 27   CHI-SQ.=   0.1 DF= 1 SIG.= 0.785
        OVERALL CHI-SQ=   0.7 DF=  7  SIG.= 0.998

 0      ISSUE GROUP =   3   ISSUE =  10   LATE RELEASE FRACT, IODINE

        LEVEL 1 NO.<MED.=  5 NO. EXP.=  3     NO.>=MED.=  2 NO. EXP.=  4   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
        LEVEL 2 NO.<MED.= 24 NO. EXP.= 24     NO.>=MED.= 25 NO. EXP.= 25   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
        LEVEL 3 NO.<MED.= 35 NO. EXP.= 36     NO.>=MED.= 38 NO. EXP.= 37   CHI-SQ.=   0.1 DF= 1 SIG.= 0.815
        LEVEL 4 NO.<MED.= 10 NO. EXP.= 10     NO.>=MED.= 11 NO. EXP.= 11   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
        OVERALL CHI-SQ=   0.1 DF=  7  SIG.= 1.000

 0      ISSUE GROUP =   3   ISSUE =  11   DUMMY ISSUE
```

```
     LEVEL 1 NO.<MED.= 37 NO. EXP.= 37     NO.>=MED.= 38 NO. EXP.= 38   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 2 NO.<MED.= 37 NO. EXP.= 37     NO.>=MED.= 38 NO. EXP.= 38   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   0.0 DF=  3  SIG.= 1.000

0    ISSUE GROUP =   3   ISSUE =  12   DUMMY ISSUE

     LEVEL 1 NO.<MED.= 21 NO. EXP.= 25     NO.>=MED.= 29 NO. EXP.= 25   CHI-SQ.=   1.3 DF= 1 SIG.= 0.258
     LEVEL 2 NO.<MED.= 29 NO. EXP.= 25     NO.>=MED.= 21 NO. EXP.= 25   CHI-SQ.=   1.3 DF= 1 SIG.= 0.258
     LEVEL 3 NO.<MED.= 24 NO. EXP.= 25     NO.>=MED.= 26 NO. EXP.= 25   CHI-SQ.=   0.1 DF= 1 SIG.= 0.777
     OVERALL CHI-SQ=   2.6 DF=  5  SIG.= 0.755

0    ISSUE GROUP =   3   ISSUE =  13   DUMMY ISSUE

     LEVEL 1 NO.<MED.= 23 NO. EXP.= 19     NO.>=MED.= 15 NO. EXP.= 19   CHI-SQ.=   1.7 DF= 1 SIG.= 0.194
     LEVEL 2 NO.<MED.= 16 NO. EXP.= 18     NO.>=MED.= 21 NO. EXP.= 19   CHI-SQ.=   0.4 DF= 1 SIG.= 0.511
     LEVEL 3 NO.<MED.= 17 NO. EXP.= 19     NO.>=MED.= 21 NO. EXP.= 19   CHI-SQ.=   0.4 DF= 1 SIG.= 0.516
     LEVEL 4 NO.<MED.= 18 NO. EXP.= 18     NO.>=MED.= 19 NO. EXP.= 19   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   2.5 DF=  7  SIG.= 0.924
```

```
1       CONSEQUENCE MEASURE:
        PROPERTY DAMAGE


        BASE CASE :
         PEACH BOTTOM LLH (MACCS)

        ISSUE LEVELS FOR EACH SAMPLE MEMBER, IN ORDER OF INCREASING RISK
              RISK  ISSUE LEVELS, FOR ALL ISSUES
              1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
3.737E+01     2  2  2  1  1  2  3  3  4  1  6  3  2  2  2  1  2  1  2  2  2  2  2  2  2  2  4  3  3  2  2  2
7.663E+01     2  1  2  2  1  4  1  3  3  1  3  3  1  2  2  2  2  2  2  1  2  2  1  2  2  3  4  3  2  1  4  3
9.603E+01     2  2  3  1  1  3  2  3  2  1  6  2  2  2  1  3  5  2  1  1  1  2  2  3  5  4  3  3  1  2  4  2
1.139E+02     3  2  2  1  3  3  3  2  3  1  5  3  2  2  2  1  2  3  2  2  2  2  2  1  4  2  4  3  2  2  4  1
1.481E+02     3  2  3  2  3  2  4  3  1  1  8  3  1  2  2  3  4  2  2  2  1  2  2  2  4  2  2  2  2  2  1  2
1.597E+02     3  2  3  2  1  2  3  2  2  1  7  2  2  2  1  3  1  2  2  1  1  1  3  3  2  2  1  2  2  2  4  3
1.747E+02     2  2  2  2  2  2  3  3  3  1  8  2  2  1  1  2  2  1  2  2  1  2  1  2  1  2  3  2  1  1  4  3
2.223E+02     2  2  2  1  2  2  2  3  3  1  9  2  2  2  1  2  4  2  2  2  2  2  1  2  4  5  4  2  2  2  4  3
2.608E+02     2  2  2  2  2  1  3  3  2  1  6  3  2  2  2  2  2  2  1  2  2  2  2  2  4  2  2  2  2  2  3  3
2.678E+02     4  2  3  2  2  3  3  1  2  2  7  2  2  2  1  2  1  2  2  2  1  2  2  3  3  3  2  3  3  1  4  3
2.783E+02     2  2  2  2  2  2  2  2  3  1  6  2  2  1  1  1  1  1  2  2  1  2  2  1  2  4  2  3  3  2  1  3
3.086E+02     2  2  3  2  3  4  2  3  3  1  6  2  2  1  2  4  1  2  2  2  1  1  2  4  2  2  3  2  1  2  3  2
3.130E+02     3  2  1  1  2  2  3  2  1  1  1  3  2  1  1  1  2  1  1  2  1  2  2  4  3  4  4  3  2  1  3  3
3.149E+02     3  2  3  1  1  3  3  4  2  1  5  3  2  1  1  2  3  2  1  2  1  2  3  3  1  2  3  3  1  3  4  3
3.371E+02     3  3  1  1  1  2  3  4  3  1  6  2  2  2  2  2  1  2  2  2  2  2  2  3  4  2  3  2  3  2  2  3
3.616E+02     3  3  2  2  3  3  3  1  1  1  9  3  2  1  1  1  3  2  2  1  2  2  1  3  2  3  4  2  2  1  2  1
3.684E+02     2  2  2  1  2  4  3  3  2  1  8  2  2  2  2  3  2  1  2  2  1  2  3  1  3  2  4  4  3  1  3  4
3.732E+02     3  3  2  1  1  2  3  3  2  1  6  2  2  1  2  2  2  2  2  2  2  2  2  4  3  2  4  4  1  1  1  2
3.922E+02     3  1  2  2  1  2  1  2  1  1  8  3  2  1  2  3  4  2  2  2  1  2  3  2  3  1  2  2  4  4  4  3
3.945E+02     3  3  3  1  1  1  2  2  3  1  4  3  2  1  2  2  2  2  2  1  2  2  3  1  2  2  2  3  1  2  4  3
4.077E+02     3  2  2  1  1  1  3  2  2  1  5  2  2  2  1  3  4  2  1  2  1  2  2  2  3  3  5  2  2  2  4  4
4.146E+02     2  2  3  2  2  3  3  4  4  1  6  2  2  2  1  1  2  2  2  2  2  2  2  3  2  2  3  3  3  1  3  4
5.039E+02     2  1  3  2  2  4  3  2  2  1  7  2  2  1  2  1  3  1  1  1  2  1  3  1  2  4  1  2  2  2  4  3
5.286E+02     3  2  1  1  3  1  1  3  4  1  9  2  2  2  2  2  4  2  2  2  1  2  2  2  2  4  2  3  2  3  3  2
5.379E+02     1  3  3  2  1  3  2  2  3  2  3  2  2  1  2  3  3  1  1  1  2  2  2  4  4  2  2  3  3  1  3  2
5.586E+02     2  2  2  1  4  2  2  3  2  1  7  3  2  1  2  1  1  2  2  2  1  2  2  3  4  2  3  3  3  2  4  4
5.626E+02     3  1  3  2  4  2  1  3  3  1  7  3  2  2  2  1  3  1  2  1  1  2  2  2  2  2  3  4  2  2  3  2
6.022E+02     3  3  4  2  2  3  2  3  2  1  7  2  1  1  1  2  1  2  2  1  1  2  2  4  3  2  2  1  2  3  2  3
6.109E+02     3  2  1  2  3  2  3  2  3  1  2  3  1  1  2  3  3  1  2  2  2  2  2  3  1  2  2  3  2  3  3  3
6.610E+02     4  2  4  2  1  3  3  2  3  1  6  3  2  1  2  3  1  2  2  2  1  2  1  3  1  4  4  4  3  4  3  2
6.614E+02     3  2  3  1  3  4  3  2  2  2  8  2  2  1  2  2  2  1  2  1  2  2  1  3  5  3  2  3  1  3  3  4
6.678E+02     2  3  3  1  3  2  2  3  4  2  8  2  2  1  2  3  2  1  2  1  1  2  2  2  2  4  4  2  2  2  4  2
6.697E+02     4  3  3  1  3  2  3  1  3  2  6  3  2  2  2  3  3  1  2  2  2  2  1  1  3  2  2  2  3  2  2  2
6.707E+02     3  1  2  1  2  3  1  4  2  1  2  2  2  1  1  2  3  2  2  1  2  1  2  1  2  2  3  2  2  2  2  4
6.816E+02     3  3  1  2  2  3  2  2  1  1  6  1  1  1  1  4  3  2  2  2  2  2  2  1  3  1  4  2  1  3  4  2
7.033E+02     2  3  3  1  1  3  2  3  3  2  7  2  2  2  1  2  2  2  2  2  1  2  2  3  4  1  3  3  2  3  4  3
7.064E+02     3  2  4  1  3  3  3  2  3  2  2  2  2  2  1  3  3  1  2  2  1  2  3  1  4  3  5  1  2  3  4  3
7.090E+02     3  3  2  1  2  2  2  3  2  1  6  2  2  1  2  2  1  1  2  1  2  2  1  2  2  2  3  3  2  3  3  2
7.170E+02     3  2  3  1  2  2  3  3  4  1  6  2  2  2  1  4  4  2  2  1  2  2  3  3  3  2  3  2  3  2  3  4
7.373E+02     1  2  2  1  2  2  3  3  3  1  5  2  2  2  1  2  4  1  2  1  2  1  4  4  1  5  3  3  3  2  1  2
7.437E+02     2  3  3  2  2  2  2  2  2  1  2  3  2  1  2  3  2  2  2  2  2  2  2  2  5  2  2  3  4  2  2  3
7.479E+02     1  3  3  1  2  3  2  1  3  1  6  2  2  2  2  3  5  3  2  1  1  2  2  4  4  3  4  3  3  1  1  3
7.746E+02     2  2  3  1  3  3  2  1  3  1  5  2  2  2  2  2  3  1  1  2  2  2  1  3  1  2  5  3  1  2  3  1
7.804E+02     3  2  3  2  2  2  3  2  1  1  5  3  2  2  1  2  2  2  2  2  1  1  2  2  4  4  4  3  2  1  4  3
8.163E+02     3  2  2  1  3  3  3  4  2  1  6  2  2  1  2  3  1  2  1  1  1  2  3  3  3  1  5  3  3  1  3  4
8.169E+02     3  2  1  2  3  3  3  3  3  2  5  2  2  1  1  2  5  2  2  2  1  2  2  2  2  2  3  2  2  2  2  3
8.607E+02     3  3  1  1  2  3  4  3  3  1  3  3  2  2  1  2  2  1  1  2  1  2  2  2  2  2  2  3  3  1  4  3
8.730E+02     4  2  1  2  2  3  2  1  4  1  4  3  2  1  1  2  1  2  1  1  1  1  3  2  4  3  4  4  2  4  4  3
8.984E+02     2  3  1  1  3  3  3  4  3  2  5  2  2  1  2  3  3  2  1  2  2  2  3  2  4  2  3  3  2  1  3  2
9.556E+02     3  1  2  1  2  3  2  2  2  2  5  2  2  1  2  2  3  2  2  1  2  2  3  2  2  4  3  3  3  3  3  4
9.570E+02     1  3  2  1  3  3  4  2  3  1  3  3  2  1  2  2  2  3  2  2  2  2  2  1  2  2  3  2  1  3  3  2
9.763E+02     1  1  3  2  2  3  4  2  2  1  2  2  2  2  2  1  3  2  1  2  1  1  2  2  3  3  3  2  2  3  2  3
9.851E+02     3  2  2  1  3  2  3  3  4  1  7  2  1  1  1  2  3  2  2  2  2  2  3  3  4  4  2  3  3  3  3  1
1.006E+03     3  2  2  1  2  4  2  3  3  1  8  3  2  1  2  2  1  1  1  2  2  2  3  1  4  3  4  3  3  2  3  3
1.008E+03     1  1  3  1  2  3  4  2  2  1  3  3  2  1  2  2  2  1  1  2  1  2  2  1  2  2  2  2  3  3  3  3
1.022E+03     2  2  4  1  4  2  3  3  3  1  6  2  2  2  1  3  2  2  2  2  1  2  1  1  2  2  2  3  2  1  4  3
1.069E+03     3  3  2  1  3  3  1  1  4  1  5  3  2  1  2  2  3  1  2  2  2  2  2  3  1  2  4  3  3  1  2  3
1.073E+03     2  3  2  1  2  4  3  2  3  2  6  2  2  1  1  2  1  1  2  1  2  2  1  3  4  1  4  4  2  2  3  2
1.081E+03     2  3  1  2  3  3  2  3  2  1  4  2  2  2  1  2  2  2  2  1  1  2  3  3  2  3  3  3  4  1  3  2
1.083E+03     1  2  2  2  4  3  2  3  3  1  8  2  2  1  1  2  3  3  2  2  1  2  3  3  4  1  4  2  2  2  4  2
1.099E+03     4  3  3  2  2  3  3  1  2  1  4  2  1  1  2  2  5  1  2  2  1  2  3  2  2  2  4  2  3  1  4  3
1.100E+03     2  1  3  2  2  1  2  3  4  1  5  2  2  2  1  2  2  3  1  2  2  2  2  3  1  2  3  3  4  2  4  2
1.114E+03     2  2  3  2  2  3  4  2  2  1  9  3  2  2  1  3  3  2  1  1  1  2  1  1  4  3  4  2  2  4  1  2
1.130E+03     4  3  3  1  2  3  3  3  2  1  6  2  2  1  2  2  2  1  2  1  2  2  2  3  3  4  2  3  3  2  2  3
1.236E+03     1  2  2  2  4  4  1  2  2  1  2  2  2  1  2  2  1  1  2  2  2  1  1  2  5  5  4  1  3  2  3  2
1.249E+03     3  3  2  1  2  1  2  3  3  1  2  2  2  2  2  2  3  2  2  1  1  2  1  2  3  3  4  3  2  4  4  3
1.348E+03     2  1  4  1  4  2  3  2  2  1  4  3  2  2  2  2  3  1  2  1  1  2  2  4  3  2  4  4  2  3  4  3
1.367E+03     3  3  2  2  2  2  3  2  2  1  8  2  2  1  2  2  2  2  2  2  2  2  3  2  2  2  5  3  3  3  4  3
1.378E+03     1  3  3  2  3  2  3  3  4  1  7  3  2  2  2  2  2  2  1  1  2  2  3  2  3  2  4  2  2  2  2  2
1.404E+03     2  1  4  1  3  2  3  1  3  1  6  2  2  2  2  2  2  3  1  2  2  2  2  3  2  2  3  3  1  3  2  3
1.420E+03     2  2  2  1  3  4  3  2  2  1  6  3  2  2  2  3  5  2  1  1  2  2  1  4  2  2  2  3  2  2  4  3
1.422E+03     2  3  2  2  3  2  2  2  2  1  4  1  2  2  2  1  3  2  2  1  1  2  2  1  4  2  2  3  2  2  3  4
1.449E+03     4  2  1  1  2  4  1  1  4  1  8  3  2  2  2  1  3  2  1  1  1  2  2  2  4  2  4  3  1  3  2  3
1.572E+03     3  2  3  1  3  3  2  2  2  1  7  3  2  1  2  3  4  3  1  1  1  2  2  2  2  3  5  3  2  3  2  3
1.609E+03     2  1  2  2  3  3  2  1  2  2  6  2  2  1  1  2  3  1  2  2  2  2  2  2  3  1  4  2  3  3  3  1
1.661E+03     3  2  3  2  3  2  3  4  2  1  9  2  2  2  1  2  3  1  2  1  1  2  1  3  4  2  5  3  3  2  3  3
```

```
1.678E+03  3  2  3  1  4  1  3  3  2  1  6  2  2  1  1  2  4  2  1  1  2  2  3  3  5  4  2  3  2  3  3  3
1.716E+03  1  3  2  1  2  2  2  3  2  1  8  2  2  1  1  2  2  1  2  2  1  2  3  2  3  2  3  3  2  3  1  2
1.820E+03  2  3  4  2  3  2  2  2  3  1  5  2  1  2  2  2  2  1  1  1  1  2  3  1  2  2  3  3  2  2  2  3
1.854E+03  2  3  4  2  3  3  3  2  3  2  3  2  2  2  2  2  1  1  1  2  2  2  2  3  5  1  4  3  1  3  3  2
1.911E+03  2  3  2  1  2  1  2  3  1  1  5  3  2  2  1  2  1  1  2  2  1  2  2  1  2  5  2  4  1  2  2  2
2.026E+03  3  2  2  2  2  3  2  3  4  1  2  2  2  1  1  3  5  2  2  1  1  1  2  3  3  3  5  4  3  3  4  2
2.236E+03  2  2  2  1  2  3  1  3  3  1  3  2  2  2  1  3  2  2  2  2  1  2  1  3  3  2  2  2  3  4  3  3
2.314E+03  2  3  3  2  3  3  2  3  2  1  1  2  2  1  1  3  2  2  2  2  2  2  3  2  4  4  4  2  2  3  1  3
2.323E+03  2  3  3  1  4  2  2  3  3  1  6  2  2  2  1  2  4  2  1  1  1  2  3  3  3  4  3  2  1  2  4  3
2.346E+03  3  2  2  1  3  1  2  2  2  1  9  2  2  2  1  3  1  3  2  1  2  2  2  3  2  3  3  4  2  3  4  3
2.655E+03  2  3  3  1  3  3  2  1  1  1  7  2  2  1  1  2  2  2  2  2  2  2  2  2  1  1  3  3  3  2  3  3
2.689E+03  1  1  2  1  2  2  4  2  2  2  6  2  2  2  1  2  4  1  1  1  2  2  2  3  4  3  4  4  4  4  3  3
2.876E+03  1  2  2  2  2  2  3  2  2  1  4  3  2  2  1  3  2  2  1  2  1  2  2  1  3  1  2  3  4  3  4  2
3.016E+03  2  2  2  2  2  3  3  2  2  1  9  2  2  2  1  2  3  2  1  2  2  2  2  3  1  3  5  3  3  3  4  4
3.022E+03  3  2  2  1  2  3  3  2  3  1  9  2  2  1  1  2  1  2  1  2  2  1  1  4  4  2  3  3  3  2  3  2
3.059E+03  3  2  3  1  3  3  4  4  3  1  7  2  2  2  1  3  2  1  1  1  1  2  4  3  2  3  2  3  3  3  4  2
3.577E+03  2  3  1  1  3  2  3  3  3  1  7  3  2  2  1  3  2  1  2  2  2  1  2  2  2  2  4  3  2  3  3  2
3.599E+03  2  3  3  2  2  3  2  2  4  2  9  2  2  1  1  3  2  2  1  1  2  2  2  1  1  2  3  4  2  2  3  3
3.636E+03  2  3  2  1  2  2  3  2  4  1  7  2  2  1  2  3  3  1  1  2  1  2  1  2  3  1  1  3  2  2  2  3
3.679E+03  2  3  2  1  2  2  1  3  1  1  4  2  2  1  2  2  3  2  1  2  2  2  1  2  1  2  2  2  2  2  4  3
3.783E+03  3  3  4  2  2  1  2  3  3  1  4  2  2  2  2  3  5  2  1  2  2  2  2  3  2  2  4  3  2  2  4  4
3.795E+03  2  2  2  2  3  1  1  3  1  1  2  2  2  1  1  3  3  1  1  2  2  2  1  2  3  2  2  3  2  4  4  2
3.964E+03  3  3  2  2  2  2  3  3  3  2  6  2  1  2  2  3  2  1  1  1  1  2  2  3  1  3  3  2  2  3  3  3
3.978E+03  4  3  3  1  2  3  2  3  2  1  3  2  2  1  1  2  4  1  1  1  2  2  3  4  2  1  4  2  3  2  2  2
4.082E+03  2  3  4  2  2  3  1  2  3  1  6  3  2  2  2  2  2  1  1  2  1  2  2  4  2  2  3  2  4  2  4  2
4.099E+03  3  3  3  2  2  3  3  3  2  1  6  2  1  2  1  2  4  3  2  1  1  1  2  3  3  4  3  4  2  1  4  2
4.100E+03  4  2  2  2  3  2  4  2  3  1  3  2  2  2  1  2  1  2  1  2  2  2  2  3  4  2  2  4  2  4  3  4
4.143E+03  3  2  3  1  2  3  1  2  2  2  2  2  2  2  1  2  2  2  1  2  1  1  3  2  2  1  3  2  3  3  2  2
4.816E+03  3  2  3  1  3  2  2  3  1  1  5  2  2  2  2  3  1  2  1  1  2  1  1  2  2  3  5  1  2  1  1  4
5.405E+03  2  3  3  1  3  2  4  3  2  1  2  3  2  1  2  1  3  2  2  2  2  2  3  3  2  4  5  3  3  3  4  3
5.530E+03  2  3  2  1  3  2  3  3  1  2  5  2  1  2  2  2  2  2  1  2  2  2  2  1  4  3  3  3  3  2  4  2
5.567E+03  3  2  3  1  3  2  2  2  2  1  3  2  2  2  2  3  3  2  2  2  1  2  2  3  4  2  1  4  3  3  3  3
5.790E+03  4  3  3  2  3  3  2  4  3  2  3  3  2  1  2  3  2  2  1  1  1  1  3  2  4  4  2  3  2  3  3  3
5.815E+03  2  3  3  1  3  2  3  2  3  1  7  2  1  1  2  3  2  1  1  1  1  2  2  3  3  2  4  3  2  2  4  4
6.563E+03  2  1  3  1  3  1  3  3  3  1  3  2  2  2  1  2  4  1  2  2  1  1  1  1  3  2  5  4  2  1  2  3
6.734E+03  3  3  4  1  3  2  1  4  3  2  7  2  1  1  1  1  2  1  1  2  2  1  3  4  3  4  3  3  1  3  4  3
6.741E+03  4  2  2  1  3  2  3  2  3  1  3  2  2  1  1  3  2  1  2  2  2  1  2  3  4  1  4  2  3  1  4  3
6.817E+03  2  4  3  1  4  2  2  2  3  2  7  3  2  2  1  2  1  2  2  1  2  2  3  2  1  3  2  2  4  1  2  3
8.012E+03  3  3  2  2  2  2  2  3  2  1  3  3  2  2  2  2  3  1  1  1  1  1  2  4  3  2  2  3  2  4  2  3
8.171E+03  2  3  2  1  2  3  2  1  3  1  5  2  1  1  1  3  5  2  1  2  1  2  1  2  2  5  2  3  3  2  2  3
8.303E+03  1  2  3  1  3  2  3  2  2  1  6  2  2  1  1  2  1  2  1  1  2  2  4  3  2  1  4  4  3  4  1  2
8.492E+03  2  2  1  1  3  2  2  4  1  1  6  2  2  2  2  3  3  1  1  1  2  2  2  3  2  2  2  3  4  3  3  3
8.680E+03  4  2  1  2  3  4  4  2  2  1  6  2  2  2  2  2  4  1  1  2  2  1  3  3  2  2  3  2  3  2  3  3
8.736E+03  2  2  3  2  3  1  2  2  3  1  8  2  2  1  1  2  4  1  1  1  2  1  2  1  2  2  4  4  3  1  3  3
8.742E+03  3  2  3  2  3  2  2  3  3  1  3  2  2  1  2  2  1  3  1  1  2  2  1  3  3  3  4  4  4  3  4  2
9.075E+03  3  3  2  1  4  1  2  2  2  1  9  2  2  1  2  2  4  1  1  2  1  2  2  2  2  2  3  3  1  3  4  2
9.329E+03  3  1  4  1  3  3  2  4  3  1  8  3  2  1  1  3  5  1  1  2  2  1  2  1  2  3  3  4  3  2  1  1
9.901E+03  3  4  2  2  4  3  2  3  2  1  5  2  2  2  2  2  4  2  2  1  2  2  3  3  2  2  3  2  3  2  4  2
1.017E+04  4  2  3  1  4  2  3  4  3  2  6  2  1  1  2  2  3  2  1  1  2  2  2  1  2  2  4  2  4  2  1  3
1.101E+04  3  4  4  1  3  2  2  4  2  2  8  2  2  2  2  2  4  2  2  2  2  1  1  3  3  2  3  3  4  2  3  3
1.106E+04  2  4  3  2  2  3  2  3  2  1  3  3  2  1  2  2  5  1  2  2  2  2  2  2  2  2  3  3  2  3  3  2
1.212E+04  3  3  2  1  3  2  2  2  2  1  7  3  2  1  1  3  1  3  1  2  1  2  3  1  3  4  4  4  2  3  3  1
1.224E+04  2  3  2  2  3  3  3  2  2  1  7  3  2  1  1  4  3  2  1  2  1  2  2  2  3  3  3  3  2  3  2  4
1.237E+04  3  3  2  2  3  4  4  3  3  1  5  3  2  1  1  1  5  2  1  2  1  2  1  3  2  2  3  2  2  4  4  2
1.508E+04  2  4  2  1  3  3  2  3  3  1  6  3  2  1  1  2  4  1  2  2  1  2  2  1  5  2  3  2  3  2  3  3
1.517E+04  3  4  4  1  2  3  3  2  2  1  3  2  2  2  2  3  1  2  1  2  2  2  2  2  2  4  4  3  1  2  3  3
1.564E+04  3  4  3  1  2  2  2  2  3  1  6  3  2  2  2  3  5  1  1  2  1  2  2  2  4  2  5  3  2  2  3  4
2.036E+04  2  3  4  1  4  4  3  3  3  1  3  3  2  2  2  3  1  1  1  1  2  2  1  2  4  4  3  2  3  2  4  3
2.235E+04  2  3  2  1  2  2  4  2  4  1  5  3  2  1  2  2  5  2  1  1  1  2  1  2  2  2  3  2  3  3  3  2
2.247E+04  3  3  3  2  2  2  2  2  1  1  9  3  2  2  2  3  3  1  1  2  2  1  3  2  2  3  4  3  3  3  4  3
2.250E+04  1  3  1  1  2  3  2  2  3  1  5  1  2  2  2  2  2  1  1  1  1  1  1  2  2  2  4  4  3  1  3  2
2.277E+04  2  3  2  1  2  3  3  3  2  1  8  1  2  1  2  2  4  3  1  1  1  2  1  3  3  2  4  3  4  3  4  3
2.592E+04  2  2  2  1  4  2  3  2  1  1  9  2  2  1  2  3  1  1  1  1  1  1  2  4  4  2  3  2  3  3  4  2
2.966E+04  1  4  3  2  1  3  2  3  3  1  9  2  2  1  1  2  2  1  1  2  2  2  2  1  4  3  4  2  2  3  4  3
3.428E+04  3  3  3  2  3  1  3  1  2  1  3  3  2  2  1  3  3  2  1  2  2  1  3  1  4  3  5  2  3  3  3  2
3.432E+04  2  3  2  1  3  2  3  2  3  1  7  2  2  2  1  2  1  3  1  2  1  2  3  3  2  4  4  2  3  4  2  2
3.446E+04  3  3  3  1  3  3  2  2  2  1  6  2  2  2  1  1  5  1  1  2  1  2  2  1  2  4  4  3  3  3  2  4
4.341E+04  2  4  3  1  3  4  2  3  2  1  6  2  2  2  1  3  3  1  2  2  2  2  3  3  2  2  2  3  2  4  3  3
5.650E+04  3  4  3  1  4  3  3  1  3  2  6  2  2  1  1  2  4  1  2  2  1  1  2  2  2  3  4  3  2  4  4  4
5.954E+04  3  4  2  2  3  2  2  3  2  1  3  3  2  2  1  2  5  3  2  1  2  2  3  2  2  2  4  3  2  3  3  4
6.538E+04  4  4  3  2  1  2  4  3  2  1  5  1  2  1  1  2  1  2  1  2  1  2  1  2  3  2  2  4  4  2  3  2
9.787E+04  4  4  3  2  2  3  2  2  2  1  6  3  2  1  1  2  3  2  1  2  1  2  3  2  4  2  2  3  3  3  3  3
1.315E+05  2  4  3  1  3  4  1  2  3  1  6  2  2  2  1  3  2  3  1  2  1  2  1  2  2  2  5  3  3  2  3  4
2.767E+05  2  4  2  1  2  3  4  4  3  1  5  3  2  1  1  3  1  2  1  1  1  1  1  2  3  4  4  2  4  3  3  3

     MEAN =     9.357E+03     VARIANCE =     7.631E+08

     PERCENTILES :
          5-TH =     2.223E+02  50-TH =     1.635E+03  95-TH =     3.446E+04
     LOGARITHMIC MIDPOINT (OF POINTS > 0.) =     3.216E+03
     NUMBER ABOVE MIDPOINT = 58
     NUMBER BELOW MIDPOINT =  92
     CHI-SQUARED(1) =     7.707E+00
     REJECT NULL (p < .01)
```

217

```
CONSEQUENCE MEASURE:
 PROPERTY DAMAGE


 BASE CASE :
  PEACH BOTTOM LLH (MACCS)

 FRACTIONAL CONTRIBUTION OF EACH SEQUENCE TO MEAN RISK
                   SEQUENCE            CONTRIBUTION
                      TB                  0.1722
                     TBUX                 0.7986
                      TBU                 0.0103
                     TCSX                 0.0045
                     TCUX                 0.0012
                    TCSRX2                0.0109
                   TCSRV23                0.0023




CONSEQUENCE MEASURE:
 PROPERTY DAMAGE


 BASE CASE :
  PEACH BOTTOM LLH (MACCS)

 FRACTIONAL CONTRIBUTION OF EACH NONZERO BIN TO MEAN RISK
                      BIN                 CONTRIBUTION
           AAACAAGEFABCCABBEDABBB            0.0001
           AAACAAGEFABCCABBEEABBB            0.0001
           AAACAAGGDABCBABBEEABBB            0.0001
           AAACACGEFABCCABBE[illegible]ABBB            0.0001
           AAACACGEFABCCABBEEABBB            0.0001
           AAACACGGDABCBABBECABBB            0.0001
           AAACACGGDABCBABBEDABBB            0.0002
           AAACACGGDABCBABBEEABBB            0.0002
           AAACACGGDABCBADBEDABBB            0.0001
           AAACACGGDABCBADBEEABBB            0.0001
           BAACAAGBDABCBBBBHHABBB            0.0001
           BAACAAGBFABCCBBBHHABBB            0.0001
           BAACACGBDAACBBBBHHABBB            0.0014
           BAACACGBDAACBDDBHHABBB            0.0012
           BAACACGBDABCBBBBHHABBB            0.0001
           BAACACGBDABCBDDBHHABBB            0.0001
           BAACACGBFAACCBBBHHABBB            0.0003
           BAACACGBFAACCDDBHHABBB            0.0001
           BAACACGBFABCCBBBHHABBB            0.0002
           BAACACGGDAACBABBDDABBB            0.0001
           BAACACGGDAACBADBDDABBB            0.0001
           BACBAAGCFABCCBBBHHABBB            0.0001
           CAACACBGDDACBABBADABAB            0.0001
           CAACACBGDDACBABBAEABAB            0.0002
           CAACACBGDDACBCDBACABAB            0.0002
           CAAC[illegible]CDBADABAB            0.0001
           [illegible]CBCDBAEABAB            0.0005
           CAACACBGDDACBCDBA[illegible]ABAB            0.0002
           CAACACBGFDACBCCBACABAB            0.0001
           CAACACBGFDACBCCBAEABAB            0.0001
           CAACACBGFDACBCDBADABAB            0.0001
           CAACACBGFDACBCDBAEABAB            0.0002
           CAACCCBGDDACBABBADABAB            0.0001
           CAACCCBGDDACBABBAEABAB            0.0001
           CAACCCBGDDACBCDBADABAB            0.0001
           CAACCCBGDDACBCDBAEABAB            0.0001
           DAAAAAGBDABCBBBBHHABBB            0.0002
           DAAAAAGBDDACBBBBHHABBB            0.0001
           DAAAAAGBDDACBDDBHHABBB            0.0005
           DAAAAAGBFABCCBBBHHABBB            0.0002
           DAAAAAGBFDACCBBBHHABBB            0.0004
           DAAAAAGBFDACCDDBHHABBB            0.0001
           DAAAACGBDABCBBBBHHABBB            0.0002
           DAAAACGBDDACBBBBHHABBB            0.0015
           DAAAACGBDDACBBBBHHBABB            0.0001
           DAAAACGBDDACBDDBHHABBB            0.0019
           DAAAACGBFABCCBBBHHABBB            0.0002
           DAAAACGBFDACCBBBHHABBB            0.0007
           DAAAACGBFDACCDDBHHABBB            0.0004
           DAAAACGGDDACBBBBADABAB            0.0001
           DAAAACGGDDACBBBBAEABAB            0.0002
           DAAAACGGDDACBDDBADABAB            0.0001
           DAAAACGGDDACBDDBAEABAB            0.0003
           DAAACCGBDDACBBBBHHABBB            0.0003
           DAAACCGBDDACBDDBHHABBB            0.0001
```

218

BEST COPY AVAILABLE

DAAACCGBFDACCBBBHHABBB	0.0001
DAAACCGBFDACCDDBHHABBB	0.0001
DABAAAGADABCBDDBHGABAB	0.0001
DABAAAGADDACBBBBHGABAB	0.0001
DABAACGADABCBBBBHGABAB	0.0005
DABAACGADDACBBBBHGABAB	0.0010
DABAACGADDACBDDBHGABAB	0.0005
DACAAAGADABCCBBBHHABBB	0.0001
EBAACCFGFDBCBADBEHBBBB	0.0001
EBAACCGGDDBCBABBEGABBB	0.0008
EBAACCGGDDBCBABBEGBBBB	0.0005
EBAACCGGDDBCBABBEHABBB	0.0018
EBAACCGGDDBCBABBEHBBBB	0.0028
EBAACCGGDDBCBADBEHABBB	0.0019
EBAACCGGDDBCBADBEHBBBB	0.0022
EBACBBGEFCBCCABBFCBABA	0.0002
EBACBBGEFCBCCABBFEABBA	0.0004
EBACBBGEFCBCCABBFFABBA	0.0001
EBACBBGGDCBCBABBFBBABA	0.0049
EBACBBGGDCBCBABBFCBABA	0.0008
EBACBBGGDCBCBABBFDABBA	0.0004
EBACBBGGDCBCBABBFEABBA	0.0008
EBACBBGGDCBCBABBFFABBA	0.0007
EBACBCGEFCBCCABBFCBABA	0.0002
EBACBCGEFCBCCABBFEABBA	0.0002
EBACBCGGDCBCBABBFBBABA	0.0025
EBACBCGGDCBCBABBFCBABA	0.0008
EBACBCGGDCBCBABBFDABBA	0.0005
EBACBCGGDCBCBABBFEABBA	0.0009
EBACBCGGDCBCBABBFFABBA	0.0007
EBACBCGGDCBCBABBFFBBBA	0.0004
EBACBCGGDCBCBADBFBBABA	0.0026
EBACBCGGDCBCBADBFEABBA	0.0002
EBACBCGGDCBCBADBFFABBA	0.0002
EBACCCDEEDBCCADBFBBABB	0.0001
EBACCCDGFDBCBABBFBBABB	0.0002
EBACCCDGFDBCBADBFBBABB	0.0024
EBACCCFGFDBBBABBFBBABB	0.0002
EBACCCFGFDBBBACBFEABBB	0.0001
EBACCCFGFDBBBADBFCBABB	0.0004
EBACCCFGFDBBBADBFEABBB	0.0017
EBACCCFGFDBCBABBFBBABB	0.0006
EBACCCFGFDBCBABBFCABBB	0.0001
EBACCCFGFDBCBABBFCBABB	0.0033
EBACCCFGFDBCBABBFEABBB	0.0092
EBACCCFGFDBCBABBFEBBBB	0.0002
EBACCCFGFDBCBABBFFABBB	0.0001
EBACCCFGFDBCBABBFGABBB	0.0001
EBACCCFGFDBCBACBFCBABB	0.0007
EBACCCFGFDBCBACBFEABBB	0.0007
EBACCCFGFDBCBADBFBBABB	0.0004
EBACCCFGFDBCBADBFCABBB	0.0002
EBACCCFGFDBCBADBFCBABB	0.0091
EBACCCFGFDBCBADBFEABBB	0.0072
EBACCCFGFDBCBADBFEBBBB	0.0010
EBACCCFGFDBCBADBFFABBB	0.0003
EBACCCFGFDBCBADBFGABBB	0.0002
EBACCCGDFDBCBABBFABAAB	0.0001
EBACCCGDFDBCBABBFBBABB	0.0001
EBACCCGDFDBCCABBFBBABB	0.0001
EBACCCGEFDBBCABBFBBABB	0.0001
EBACCCGEFDBCCABBFBBABB	0.0002
EBACCCGEFDBCCABBFCABBB	0.0001
EBACCCGEFDBCCABBFCBABB	0.0004
EBACCCGEFDBCCABBFEABBB	0.0005
EBACCCGEFDBCCADBFCBABB	0.0030
EBACCCGEFDBCCADBFEBBBB	0.0004
EBACCCGFFDBCBABBFEABBB	0.0001
EBACCCGFFDBCCABBFEABBB	0.0001
EBACCCGGDDBBBABBFABABB	0.0007
EBACCCGGDDBBBABBFBBABB	0.0001
EBACCCGGDDBBBABBFEABBB	0.0011
EBACCCGGDDBBBABBFFABBB	0.0008
EBACCCGGDDBBBABBFGABBB	0.0001
EBACCCGGDDBBBADBFABABB	0.0012
EBACCCGGDDBBBADBFCBABB	0.0008
EBACCCGGDDBBBADBFEABBB	0.0002
EBACCCGGDDBBBADBFFBBBB	0.0001
EBACCCGGDDBCBABBFABABB	0.0732
EBACCCGGDDBCBABBFBABAB	0.0002
EBACCCGGDDBCBABBFBBABB	0.2165
EBACCCGGDDBCBABBFCBABB	0.0329
EBACCCGGDDBCBABBFCBBBB	0.0020
EBACCCGGDDBCBABBFDABBB	0.0297
EBACCCGGDDBCBABBFDBBBB	0.0011
EBACCCGGDDBCBABBFEABBB	0.0214

EBACCCGGDDBCABBFEBBBB	0.0211
EBACCCGGDDBCABBFFABBB	0.0169
EBACCCGGDDBCABBFFBBBB	0.0063
EBACCCGGDDBCABBFGABBB	0.0089
EBACCCGGDDBCADBFABABB	0.0517
EBACCCGGDDBCADBFBBABB	0.1562
EBACCCGGDDBCADBFCBABB	0.0037
EBACCCGGDDBCADBFEABBB	0.0216
EBACCCGGDDBCADBFEBBBB	0.0018
EBACCCGGDDBCADBFFABBB	0.0138
EBACCCGGDDBCADBFFBBBB	0.0190
EBACCCGGDDBCADBFGABBB	0.0003
EBACCCGGEDBBBABBFBBABB	0.0006
EBACCCGGEDBBBABBFFBBBB	0.0001
EBACCCGGEDBBBADBFEABBB	0.0009
EBACCCGGEDBCABBFBBABB	0.0013
EBACCCGGEDBCABBFCABBB	0.0001
EBACCCGGEDBCABBFCBABB	0.0090
EBACCCGGEDBCABBFCBBBB	0.0014
EBACCCGGEDBCABBFEABBB	0.0060
EBACCCGGEDBCABBFEBBBB	0.0004
EBACCCGGEDBCABBFFABBB	0.0002
EBACCCGGEDBCABBFFBBBB	0.0001
EBACCCGGEDBCABBFGABBB	0.0001
EBACCCGGEDBCADBFCBABB	0.0072
EBACCCGGEDBCADBFEABBB	0.0015
EBACCCGGEDBCADBFEBBBB	0.0003
EBACCCGGEDBCADBFFBBBB	0.0001
EBBBACGEFBBCCABBDGABBB	0.0004
EBBBACGEFBBCCABBEGABBB	0.0004
EBBBACGGDBBBBABBDGABBB	0.0002
EBBBACGGDBBBBABBEGABBB	0.0002
EBBBACGGDBBCABBDGABBB	0.0009
EBBBACGGDBBCABBEGABBB	0.0010
EBBBACGGDBBCADBDGABBB	0.0005
EBBBACGGDBBCADBEGABBB	0.0005
FCACBBGGDCBCABBDBBABA	0.0001
FCACBBGGDCBCABBDCBABA	0.0001
FCACBBGGDCBCABBEBBABA	0.0001
FCACBBGGDCBCABBEEABBA	0.0001
FCACBCGGDCBCABBDBBABA	0.0001
FCACBCGGDCBCABBDCBABA	0.0001
FCACBCGGDCBCABBDEABBA	0.0001
FCACBCGGDCBCABBEBBABA	0.0001
FCACBCGGDCBCABBEEABBA	0.0001
FCACBCGGDCBCADBDCBABA	0.0001
FCACBCGGDCBCADBDFABBA	0.0001
FCACBCGGDCBCADBECBABA	0.0001
FCACCCDGFDBCACBEBBABB	0.0001
FCACCCDGFDBCADBDBBABB	0.0005
FCACCCDGFDBCADBDCBABB	0.0001
FCACCCDGFDBCADBDEABBB	0.0003
FCACCCDGFDBCADBEBBABB	0.0011
FCACCCDGFDBCADBECBABB	0.0002
FCACCCFGFDBCABBDEABBB	0.0002
FCACCCFGFDBCABBEEABBB	0.0004
FCACCCFGFDBCABBGEABBB	0.0003
FCACCCFGFDBCADBCFABBB	0.0001
FCACCCFGFDBCADBDFABBB	0.0001
FCACCCFGFDBCADBEBBABB	0.0001
FCACCCFGFDBCADBECBABB	0.0001
FCACCCFGFDBCADBEEABBB	0.0008
FCACCCFGFDBCADBEFABBB	0.0001
FCACCCFGFDBCADBEGABBB	0.0002
FCACCCGBDDBCABBHHABBB	0.0002
FCACCCGBDDBCABBHHBABB	0.0002
FCACCCGBDDBCBDDBHHABBB	0.0022
FCACCCGBDDBCBDDBHHBABB	0.0015
FCACCCGBFDBCCDDBHHABBB	0.0001
FCACCCGBFDBCCDDBHHBABB	0.0001
FCACCCGDFDBCABBEBEABB	0.0001
FCACCCGDFDBCADBDCBABB	0.0004
FCACCCGDFDBCCABBEBBABB	0.0001
FCACCCGEFDBCCABBEEABBB	0.0001
FCACCCGEFDBCCADBEGABBB	0.0003
FCACCCGFFDBCCABBGEABBB	0.0001
FCACCCGGDDBBBABBEABABB	0.0001
FCACCCGGDDBBBABBECBABB	0.0005
FCACCCGGDDBBBABBEEABBB	0.0026
FCACCCGGDDBBBABBEEBBBB	0.0001
FCACCCGGDDBBBADBEBBABB	0.0001
FCACCCGGDDBBBADBGCBABB	0.0003
FCACCCGGDDBCABBCABABB	0.0001
FCACCCGGDDBCABBCBBABB	0.0021
FCACCCGGDDBCABBDABABB	0.0017
FCACCCGGDDBCABBDBBABB	0.0085

220

FCACCCGGDDBCBABBDCABBB	0.0001
FCACCCGGDDBCBABBDCBABB	0.0043
FCACCCGGDDBCBABBDDABBB	0.0017
FCACCCGGDDBCBABBDEABBB	0.0093
FCACCCGGDDBCBABBDEBBBB	0.0007
FCACCCGGDDBCBABBDFABBB	0.0014
FCACCCGGDDBCBABBDFBBBB	0.0002
FCACCCGGDDBCBABBDGABBB	0.0061
FCACCCGGDDBCBABBEABABB	0.0038
FCACCCGGDDBCBABBEBBABB	0.0149
FCACCCGGDDBCBABBECBABB	0.0024
FCACCCGGDDBCBABBEDABBB	0.0031
FCACCCGGDDBCBABBEEABBB	0.0138
FCACCCGGDDBCBABBEEBBBB	0.0004
FCACCCGGDDBCBABBEFABBB	0.0013
FCACCCGGDDBCBABBEFBBBB	0.0007
FCACCCGGDDBCBABBEGABBB	0.0005
FCACCCGGDDBCBABBGABABB	0.0001
FCACCCGGDDBCBABBGBBABB	0.0018
FCACCCGGDDBCBABBGCBABB	0.0053
FCACCCGGDDBCBABBGEABBB	0.0001
FCACCCGGDDBCBACBEABABB	0.0001
FCACCCGGDDBCBADBDABABB	0.0021
FCACCCGGDDBCBADBDBBABB	0.0052
FCACCCGGDDBCBADBDCBABB	0.0072
FCACCCGGDDBCBADBDEABBB	0.0024
FCACCCGGDDBCBADBDEBBBB	0.0005
FCACCCGGDDBCBADBDFABBB	0.0017
FCACCCGGDDBCBADBDGABBB	0.0152
FCACCCGGDDBCBADBEABABB	0.0036
FCACCCGGDDBCBADBEBBABB	0.0023
FCACCCGGDDBCBADBECBABB	0.0114
FCACCCGGDDBCBADBEEABBB	0.0056
FCACCCGGDDBCBADBEEBBBB	0.0006
FCACCCGGDDBCBADBEFABBB	0.0015
FCACCCGGDDBCBADBEFBBBB	0.0001
FCACCCGGDDBCBADBGCBABB	0.0005
FCACCCGGDDBCBADBGEABBB	0.0007
FCACCCGGDDBCBDDBHABABB	0.0001
FCACCCGGEDBBBABBDEABBB	0.0001
FCACCCGGEDBCBABBDEABBB	0.0002
FCACCCGGEDBCBABBEBBABB	0.0004
FCACCCGGEDBCBABBECBABB	0.0001
FCACCCGGEDBCBABBEEABBB	0.0007
FCACCCGGEDBCBABBGEABBB	0.0007
FCACCCGGEDBCBABBGFABBB	0.0001
FCACCCGGEDBCBADBCFABBB	0.0001
FCACCCGGEDBCBADBDCBABB	0.0001
FCACCCGGEDBCBADBEGABBB	0.0001
FCBBAAGCDBBBBBBBHHABBB	0.0002
FCBBAAGCDBBBBDDBHHABBB	0.0001
FCBBAAGCDBBCBBBBHHABBB	0.0003
FCBBAAGCDBBCBDDBHHABBB	0.0001
FCBBAAGCFBBBCBBBHHABBB	0.0001
FCBBAAGCFBBCCBBBHHABBB	0.0003
FCBBAAGCFBBCCDDBHHABBB	0.0001
FCBBAAGGDBBCBABBEGABBB	0.0001
FCBBACGCDBBBBBBBHHABBB	0.0002
FCBBACGCDBBBBDDBHHABBB	0.0001
FCBBACGCDBBCBBBBHHABBB	0.0005
FCBBACGCDBBCBBBBHHBBBB	0.0001
FCBBACGCDBBCBDDBHHABBB	0.0002
FCBBACGCFBBBCBBBHHABBB	0.0001
FCBBACGCFBBCCBBBHHABBB	0.0004
FCBBACGCFBBCCBBBHHBBBB	0.0001
FCBBACGCFBBCCDDBHHABBB	0.0002
FCBBACGEFBBBCABBEGABBB	0.0001
FCBBACGEFBBCCABBEGABBB	0.0003
FCBBACGEFBBCCADBEGABBB	0.0001
FCBBACGGDBBBBABBEGABBB	0.0001
FCBBACGGDBBCBABBEGABBB	0.0004
FCBBACGGDBBCBADBEGABBB	0.0002
FCCBAAGCFBBACBBBHHABBB	0.0001
FCCBAAGCFBBBCBBBHHABBB	0.0007
FCCBAAGCFBBBCDDBHHABBB	0.0002
FCCBAAGCFBBCCBBBHHABBB	0.0023
FCCBAAGCFBBCCDDBHHABBB	0.0007

CONSEQUENCE MEASURE:
PROPERTY DAMAGE

BASE CASE :
PEACH BOTTOM LLH (MACCS)

FRACTIONAL CONTRIBUTIONS OF EACH RELEASE TO MEAN RISK

RELEASE	CONTRIBUTION
PCH 1D	0.0001
PCH 2D	0.0014
PCH 3D	0.0094
PCH 4D	0.0250
PCH 5D	0.0344
PCH 6D	0.0456
PCH 7D	0.1379
PCH 8D	0.3237
PCH 9D	0.4040
PCH 10D	0.0000
PCH 11D	0.0000
PCH 12D	0.0002
PCH 13D	0.0000
PCH 14D	0.0000
PCH 15D	0.0001
PCH 16D	0.0000
PCH 17D	0.0000
PCH 18D	0.0000
PCH 19D	0.0001
PCH 20D	0.0001
PCH 21D	0.0002
PCH 22D	0.0006
PCH 23D	0.0003
PCH 24D	0.0016
PCH 25D	0.0000
PCH 26D	0.0003
PCH 27D	0.0004
PCH 28D	0.0013
PCH 29D	0.0007
PCH 30D	0.0005
PCH 31D	0.0016
PCH 32D	0.0002
PCH 33D	0.0017
PCH 34D	0.0024
PCH 35D	0.0000
PCH 36D	0.0009
PCH 37D	0.0002
PCH 38D	0.0004
PCH 39D	0.0005
PCH 40D	0.0000
PCH 41D	0.0011
PCH 42D	0.0002
PCH 43D	0.0002
PCH 44D	0.0001
PCH 45D	0.0002
PCH 46D	0.0003
PCH 47D	0.0012
PCH 48D	0.0002
PCH 49D	0.0000
PCH 50D	0.0003
PCH 51D	0.0001
PCH 52D	0.0001
PCH 53D	0.0000
PCH 54D	0.0000

221

```
CONSEQUENCE MEASURE:
  PROPERTY DAMAGE

  SENSITIVITY OF RISK TO ISSUES
  DISTRIBUTION OF RISK AT EACH LEVEL OF EACH ISSUE
  BASE CASE :
   PEACH BOTTOM LLH (MACCS)

 GP ISS LVL NUM      5%          50%         MEAN         95%        R**2    F  DF       SIGNIF.
  1   1   1  15  0.5820E+03  0.1236E+04  0.5099E+04  0.2768E+05   0.01     0.5(  3,146)   0.67NS
          3  60  0.2236E+03  0.1307E+04  0.6446E+04  0.3437E+05
          2  60  0.1295E+03  0.2067E+04  0.1219E+05  0.3860E+05
          4  15  0.3356E+03  0.3978E+04  0.1392E+05  0.8848E+05
  1   2   1  15  0.1153E+03  0.1008E+04  0.1946E+04  0.8544E+04   0.30    20.5(  3,146)   0.00**
          2  60  0.1299E+03  0.9955E+03  0.2570E+04  0.8739E+04
          3  60  0.3837E+03  0.2318E+04  0.6248E+04  0.2794E+05
          4  15  0.7484E+04  0.2966E+05  0.5635E+05  0.2298E+06
  1   3   1  15  0.3189E+03  0.8730E+03  0.3447E+04  0.1773E+05   0.02     1.0(  3,146)   0.42NS
          4  15  0.6164E+03  0.1854E+04  0.5326E+04  0.1892E+05
          2  60  0.1411E+03  0.1662E+04  0.1006E+05  0.2983E+05
          3  60  0.2068E+03  0.1970E+04  0.1113E+05  0.6078E+05
  1   4   2  62  0.1685E+03  0.1400E+04  0.7442E+04  0.4275E+05   0.01     0.9(  1,148)   0.33NS
          1  88  0.3025E+03  0.1811E+04  0.1071E+05  0.3526E+05
  1   5   1  15  0.4472E+02  0.3922E+03  0.6635E+04  0.5365E+05   0.13     7.5(  3,146)   0.00**
          3  60  0.3341E+03  0.2850E+04  0.9230E+04  0.3867E+05
          4  15  0.5596E+03  0.2323E+04  0.9904E+04  0.4650E+05
          2  60  0.2643E+03  0.1307E+04  0.1003E+05  0.2263E+05
  2   1   1  15  0.2892E+03  0.1911E+04  0.5074E+04  0.2459E+05   0.00     0.0(  3,146)   0.99NS
          2  60  0.1670E+03  0.2056E+04  0.6835E+04  0.2983E+05
          3  60  0.2904E+03  0.1333E+04  0.1155E+05  0.4412E+05
          4  15  0.1086E+03  0.1236E+04  0.1496E+05  0.9966E+05
  2   2   3  60  0.1670E+03  0.1114E+04  0.5314E+04  0.2981E+05   0.05     2.4(  3,146)   0.07NS
          2  60  0.2930E+03  0.2318E+04  0.8612E+04  0.3867E+05
          1  15  0.1153E+03  0.1449E+04  0.1081E+05  0.6255E+05
          4  15  0.2299E+03  0.3059E+04  0.2706E+05  0.1929E+06
  2   3   3  60  0.1192E+03  0.1521E+04  0.6487E+04  0.3588E+05   0.01     0.6(  3,146)   0.60NS
          1  15  0.2887E+03  0.1099E+04  0.7462E+04  0.4987E+05
          2  60  0.2951E+03  0.2086E+04  0.9432E+04  0.3439E+05
          4  15  0.3203E+03  0.3059E+04  0.2243E+05  0.1236E+06
  2   4   4  15  0.6821E+02  0.1069E+04  0.2722E+04  0.1419E+05   0.02     0.8(  3,146)   0.47NS
          1  15  0.1785E+03  0.2655E+04  0.5463E+04  0.2501E+05
          2  60  0.2643E+03  0.1635E+04  0.8828E+04  0.5084E+05
          3  60  0.1970E+03  0.2036E+04  0.1252E+05  0.4404E+05
  2   5   2  24  0.4363E+03  0.1727E+04  0.5349E+04  0.1798E+05   0.00     0.0(  1,148)   0.89NS
          1 126  0.1716E+03  0.1616E+04  0.1012E+05  0.3608E+05
  2   6   1   2*************************  0.1313E+04************   0.05     1.0(  8,141)   0.47NS
          4   9  0.3945E+03  0.1348E+04  0.1840E+04  0.3783E+04
          2  11  0.6138E+03  0.1236E+04  0.1960E+04  0.5334E+04
          8  16  0.1556E+03  0.1217E+04  0.3908E+04  0.1831E+05
          7  20  0.2068E+03  0.2043E+04  0.4913E+04  0.2050E+05
          9  12  0.2334E+03  0.3019E+04  0.8445E+04  0.2926E+05
          3  20  0.2030E+03  0.5677E+04  0.9872E+04  0.4518E+05
          6  38  0.1432E+03  0.1412E+04  0.1220E+05  0.7856E+05
          5  22  0.2097E+03  0.1415E+04  0.1998E+05  0.1164E+06
  2   7   2  94  0.2699E+03  0.1767E+04  0.6487E+04  0.3333E+05   0.02     1.3(  2,147)   0.28NS
          3  51  0.1154E+03  0.1378E+04  0.1335E+05  0.5792E+05
          1   5  0.6816E+03  0.2250E+05  0.2255E+05  0.6538E+05
  2   8   1  15  0.9035E+02  0.1820E+04  0.3367E+04  0.9626E+04   0.00     0.2(  1,148)   0.66NS
          2 135  0.2625E+03  0.1609E+04  0.1002E+05  0.4097E+05
  2   9   2  75  0.1216E+03  0.1820E+04  0.7843E+04  0.3442E+05   0.00     0.0(  1,148)   0.89NS
          1  75  0.3135E+03  0.1572E+04  0.1087E+05  0.4809E+05
  2  10   2  75  0.1706E+03  0.1348E+04  0.4581E+04  0.2244E+05   0.01     2.2(  1,148)   0.14NS
          1  75  0.2329E+03  0.2323E+04  0.1413E+05  0.6387E+05
  2  11   4   4*************************  0.3487E+04************   0.05     2.3(  3,146)   0.08NS
          1  16  0.5221E+02  0.5606E+03  0.4122E+04  0.2534E+05
          2  80  0.2643E+03  0.1635E+04  0.7754E+04  0.4404E+05
          3  50  0.1597E+03  0.2966E+04  0.1407E+05  0.4341E+05
  2  12   2  45  0.1032E+03  0.1367E+04  0.5948E+04  0.2411E+05   0.04     1.7(  4,145)   0.15NS
          3  38  0.4129E+03  0.1298E+04  0.7480E+04  0.3949E+05
          4  22  0.1890E+03  0.3270E+04  0.7628E+04  0.3275E+05
          5  15  0.1604E+03  0.8171E+04  0.1219E+05  0.5193E+05
          1  30  0.2678E+03  0.1882E+04  0.1670E+05  0.6538E+05
  2  13   1  60  0.2951E+03  0.1882E+04  0.7212E+04  0.3197E+05   0.03     2.6(  2,147)   0.08NS
          2  75  0.1735E+03  0.1367E+04  0.9179E+04  0.3080E+05
          3  15  0.1824E+03  0.2346E+04  0.1883E+05  0.1079E+06
  2  14   2  75  0.1509E+03  0.9556E+03  0.3984E+04  0.1395E+05   0.20    36.8(  1,148)   0.00**
          1  75  0.3359E+03  0.3978E+04  0.1473E+05  0.5570E+05
  2  15   2  90  0.2223E+03  0.1662E+04  0.8993E+04  0.4340E+05   0.00     0.1(  1,148)   0.78NS
          1  60  0.2403E+03  0.1616E+04  0.9903E+04  0.2429E+05
  2  16   2  75  0.2314E+03  0.1678E+04  0.5729E+04  0.2767E+05   0.00     0.0(  1,148)   1.00NS
          1  75  0.1943E+03  0.1572E+04  0.1298E+05  0.6304E+05
  2  17   2 120  0.1970E+03  0.1391E+04  0.7213E+04  0.3439E+05   0.04     6.5(  1,148)   0.01**
          1  30  0.3086E+03  0.5280E+04  0.1793E+05  0.5650E+05
  3   1   4   3*************************  0.4060E+04************   0.02     0.8(  3,146)   0.48NS
          2  74  0.1658E+03  0.1435E+04  0.4976E+04  0.2343E+05
          3  39  0.3379E+03  0.1678E+04  0.9754E+04  0.5165E+05
```

```
            1  34  0.1833E+03  0.2600E+04  0.1890E+05  0.1143E+06
 3    2     4  15  0.3097E+03  0.1348E+04  0.3876E+04  0.1933E+05   0.01     0.5(  3,146)    0.72NS
            3  51  0.2700E+03  0.1854E+04  0.4840E+04  0.2208E+05
            1  29  0.2661E+03  0.1422E+04  0.6449E+04  0.3429E+05
            2  55  0.1543E+03  0.1609E+04  0.1657E+05  0.8848E+05
 3    3     1  14  0.1965E+03  0.1085E+04  0.2084E+04  0.6116E+04   0.03     1.0(  4,145)    0.41NS
            5   7  0.9603E+02  0.1236E+04  0.3050E+04  0.1508E+05
            4  35  0.1639E+03  0.1114E+04  0.7890E+04  0.3306E+05
            2  58  0.1994E+03  0.2679E+04  0.1043E+05  0.5085E+05
            3  36  0.3287E+03  0.1864E+04  0.1311E+05  0.4764E+05
 3    4     5   5  0.2223E+03  0.1236E+04  0.2455E+04  0.8171E+04   0.01     0.2(  4,145)    0.95NS
            1  15  0.4503E+03  0.1854E+04  0.2708E+04  0.7939E+04
            3  30  0.2678E+03  0.2180E+04  0.7286E+04  0.3428E+05
            2  76  0.1641E+03  0.1421E+04  0.9258E+04  0.5415E+05
            4  24  0.2022E+03  0.1970E+04  0.1785E+05  0.6437E+05
 3    5     1   4**************************  0.2467E+04*************   0.02     0.6(  4,145)    0.69NS
            3  46  0.2754E+03  0.2056E+04  0.4955E+04  0.2075E+05
            2  35  0.2704E+03  0.1420E+04  0.8027E+04  0.5902E+05
            4  50  0.1139E+03  0.1413E+04  0.1349E+05  0.5650E+05
            5  15  0.4678E+03  0.2026E+04  0.1404E+05  0.9395E+05
 3    6     1   4**************************  0.1840E+04*************   0.02     0.9(  3,146)    0.47NS
            4  23  0.3715E+03  0.3599E+04  0.7537E+04  0.3269E+05
            3  76  0.1472E+03  0.1435E+04  0.8763E+04  0.5221E+05
            2  47  0.1723E+03  0.1378E+04  0.1185E+05  0.3429E+05
 3    7     1  18  0.1220E+03  0.8610E+03  0.2481E+04  0.1235E+05   0.07     3.8(  3,146)    0.01**
            2  62  0.1550E+03  0.1399E+04  0.5693E+04  0.3454E+05
            3  55  0.2919E+03  0.2236E+04  0.1060E+05  0.3442E+05
            4  15  0.4602E+03  0.6817E+04  0.2820E+05  0.1929E+06
 3    8     1  25  0.1421E+03  0.8607E+03  0.2862E+04  0.1107E+05   0.10     5.1(  3,146)    0.00**
            2  58  0.1265E+03  0.1305E+04  0.6705E+04  0.1832E+05
            4  15  0.4468E+03  0.3795E+04  0.1201E+05  0.5290E+05
            3  52  0.6031E+03  0.2597E+04  0.1467E+05  0.5637E+05
 3    9     1  12  0.1577E+03  0.1383E+04  0.3344E+04  0.1008E+05   0.01     0.7(  3,146)    0.55NS
            2  27  0.2424E+03  0.1449E+04  0.5159E+04  0.3434E+05
            4  54  0.1219E+03  0.1393E+04  0.5588E+04  0.2526E+05
            3  57  0.3314E+03  0.1854E+04  0.1618E+05  0.8498E+05
 3   10     1   7  0.1139E+03  0.9851E+03  0.3613E+04  0.1212E+05   0.01     0.3(  3,146)    0.81NS
            2  49  0.1449E+03  0.1854E+04  0.6665E+04  0.3428E+05
            3  73  0.2277E+03  0.1572E+04  0.9771E+04  0.2850E+05
            4  21  0.3895E+03  0.3016E+04  0.1611E+05  0.8504E+05
 3   11     2  75  0.1633E+03  0.1911E+04  0.8399E+04  0.5290E+05   0.00     0.2(  1,148)    0.67NS
            1  75  0.2856E+03  0.1420E+04  0.1032E+05  0.3197E+05
 3   12     2  50  0.1481E+03  0.1243E+04  0.3586E+04  0.1237E+05   0.03     1.9(  2,147)    0.15NS
            3  50  0.2678E+03  0.1259E+04  0.9834E+04  0.3446E+05
            1  50  0.4077E+03  0.2781E+04  0.1465E+05  0.5954E+05
 3   13     1  38  0.1343E+03  0.1413E+04  0.4796E+04  0.1920E+05   0.02     0.8(  3,146)    0.50NS
            4  37  0.1914E+03  0.1367E+04  0.5394E+04  0.2477E+05
            3  38  0.3236E+03  0.1865E+04  0.1082E+05  0.5831E+05
            2  37  0.1569E+03  0.2655E+04  0.1650E+05  0.8217E+05
 3   14     3  30  0.1139E+03  0.1748E+04  0.5353E+04  0.3445E+05   0.00     0.1(  4,145)    0.99NS
            4  30  0.2678E+03  0.1384E+04  0.5401E+04  0.2250E+05
            5  30  0.9603E+02  0.1180E+04  0.8674E+04  0.5954E+05
            2  30  0.3130E+03  0.1435E+04  0.1012E+05  0.5650E+05
            1  30  0.1597E+03  0.2511E+04  0.1723E+05  0.1315E+06
NS=NOT SIGNIFICANT, *=SIGNIFICANT (P<.05), **=SIGNIFICANT (P<.01)
```

22L

```
        CONSEQUENCE MEASURE:  PROPERTY DAMAGE
0       ISSUE GROUP =   1   ISSUE =   1   SLC FAILURE TO ACTUATE

        LEVEL 1 NO.<MED.=  9 NO. EXP.=  7     NO.>=MED.=  6 NO. EXP.=  8   CHI-SQ.=   1.1 DF= 1 SIG.= 0.301
        LEVEL 2 NO.<MED.= 26 NO. EXP.= 30     NO.>=MED.= 34 NO. EXP.= 30   CHI-SQ.=   1.1 DF= 1 SIG.= 0.302
        LEVEL 3 NO.<MED.= 32 NO. EXP.= 30     NO.>=MED.= 28 NO. EXP.= 30   CHI-SQ.=   0.3 DF= 1 SIG.= 0.606
        LEVEL 4 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
        OVERALL CHI-SQ=   2.4 DF=  7  SIG.= 0.934

0       ISSUE GROUP =   1   ISSUE =   2   DC COMMON MODE

        LEVEL 1 NO.<MED.= 11 NO. EXP.=  7     NO.>=MED.=  4 NO. EXP.=  8   CHI-SQ.=   4.3 DF= 1 SIG.= 0.038
        LEVEL 2 NO.<MED.= 38 NO. EXP.= 30     NO.>=MED.= 22 NO. EXP.= 30   CHI-SQ.=   4.3 DF= 1 SIG.= 0.039
        LEVEL 3 NO.<MED.= 25 NO. EXP.= 30     NO.>=MED.= 35 NO. EXP.= 30   CHI-SQ.=   1.7 DF= 1 SIG.= 0.197
        LEVEL 4 NO.<MED.=  0 NO. EXP.=  7     NO.>=MED.= 15 NO. EXP.=  8   CHI-SQ.=  13.1 DF= 1 SIG.= 0.000
        OVERALL CHI-SQ=  23.3 DF=  7  SIG.= 0.001

0       ISSUE GROUP =   1   ISSUE =   3   FAILURE TO VENT

        LEVEL 1 NO.<MED.= 11 NO. EXP.=  7     NO.>=MED.=  4 NO. EXP.=  8   CHI-SQ.=   4.3 DF= 1 SIG.= 0.038
        LEVEL 2 NO.<MED.= 29 NO. EXP.= 30     NO.>=MED.= 31 NO. EXP.= 30   CHI-SQ.=   0.1 DF= 1 SIG.= 0.796
        LEVEL 3 NO.<MED.= 28 NO. EXP.= 30     NO.>=MED.= 32 NO. EXP.= 30   CHI-SQ.=   0.3 DF= 1 SIG.= 0.606
        LEVEL 4 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
        OVERALL CHI-SQ=   4.9 DF=  7  SIG.= 0.674

0       ISSUE GROUP =   1   ISSUE =   4   SW MOD A VS. MOD B

        LEVEL 1 NO.<MED.= 42 NO. EXP.= 44     NO.>=MED.= 46 NO. EXP.= 44   CHI-SQ.=   0.2 DF= 1 SIG.= 0.670
        LEVEL 2 NO.<MED.= 32 NO. EXP.= 31     NO.>=MED.= 30 NO. EXP.= 31   CHI-SQ.=   0.1 DF= 1 SIG.= 0.799
        OVERALL CHI-SQ=   0.2 DF=  3  SIG.= 0.970

0       ISSUE GROUP =   1   ISSUE =   5   POWER RECOVERY

        LEVEL 1 NO.<MED.= 13 NO. EXP.=  7     NO.>=MED.=  2 NO. EXP.=  8   CHI-SQ.=   9.6 DF= 1 SIG.= 0.002
        LEVEL 2 NO.<MED.= 32 NO. EXP.= 30     NO.>=MED.= 28 NO. EXP.= 30   CHI-SQ.=   0.3 DF= 1 SIG.= 0.606
        LEVEL 3 NO.<MED.= 23 NO. EXP.= 30     NO.>=MED.= 37 NO. EXP.= 30   CHI-SQ.=   3.3 DF= 1 SIG.= 0.071
        LEVEL 4 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
        OVERALL CHI-SQ=  13.4 DF=  7  SIG.= 0.062

0       ISSUE GROUP =   2   ISSUE =   1   PROB. OF STUCK OPEN VAC. BRKR.

        LEVEL 1 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
        LEVEL 2 NO.<MED.= 27 NO. EXP.= 30     NO.>=MED.= 33 NO. EXP.= 30   CHI-SQ.=   0.6 DF= 1 SIG.= 0.439
        LEVEL 3 NO.<MED.= 31 NO. EXP.= 30     NO.>=MED.= 29 NO. EXP.= 30   CHI-SQ.=   0.1 DF= 1 SIG.= 0.796
        LEVEL 4 NO.<MED.= 10 NO. EXP.=  7     NO.>=MED.=  5 NO. EXP.=  8   CHI-SQ.=   2.4 DF= 1 SIG.= 0.12
        OVERALL CHI-SQ=   3.3 DF=  7  SIG.= 0.851

0       ISSUE GROUP =   2   ISSUE =   2   HPSW-SPRAY

        LEVEL 1 NO.<MED.=  8 NO. EXP.=  7     NO.>=MED.=  7 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
```

225

```
     LEVEL 2 NO.<MED.= 24 NO. EXP.= 30     NO.>=MED.= 36 NO. EXP.= 30   CHI-SQ.=   2.4 DF= 1 SIG.= 0.121
     LEVEL 3 NO.<MED.= 36 NO. EXP.= 30     NO.>=MED.= 24 NO. EXP.= 30   CHI-SQ.=   2.4 DF= 1 SIG.= 0.121
     LEVEL 4 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
     OVERALL CHI-SQ=   5.3 DF=  7  SIG.= 0.619

0    ISSUE GROUP =   2   ISSUE =   3   VENT-SBO-HACR

     LEVEL 1 NO.<MED.= 10 NO. EXP.=  7     NO.>=MED.=  5 NO. EXP.=  8   CHI-SQ.=   2.4 DF= 1 SIG.= 0.120
     LEVEL 2 NO.<MED.= 28 NO. EXP.= 30     NO.>=MED.= 32 NO. EXP.= 30   CHI-SQ.=   0.3 DF= 1 SIG.= 0.606
     LEVEL 3 NO.<MED.= 30 NO. EXP.= 30     NO.>=MED.= 30 NO. EXP.= 30   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 4 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
     OVERALL CHI-SQ=   2.9 DF=  7  SIG.= 0.890

0    ISSUE GROUP =   2   ISSUE =   4   VENT-SBO-ACR

     LEVEL 1 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
     LEVEL 2 NO.<MED.= 29 NO. EXP.= 30     NO.>=MED.= 31 NO. EXP.= 30   CHI-SQ.=   0.1 DF= 1 SIG.= 0.796
     LEVEL 3 NO.<MED.= 28 NO. EXP.= 30     NO.>=MED.= 32 NO. EXP.= 30   CHI-SQ.=   0.3 DF= 1 SIG.= 0.606
     LEVEL 4 NO.<MED.= 11 NO. EXP.=  7     NO.>=MED.=  4 NO. EXP.=  8   CHI-SQ.=   4.3 DF= 1 SIG.= 0.038
     OVERALL CHI-SQ=   4.9 DF=  7  SIG.= 0.674

0    ISSUE GROUP =   2   ISSUE =   5   SP BYPASS, SMALL/LARGE

     LEVEL 1 NO.<MED.= 63 NO. EXP.= 63     NO.>=MED.= 63 NO. EXP.= 63   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 2 NO.<MED.= 11 NO. EXP.= 12     NO.>=MED.= 13 NO. EXP.= 12   CHI-SQ.=   0.2 DF= 1 SIG.= 0.683
     OVERALL CHI-SQ=   0.2 DF=  3  SIG.= 0.983

0    ISSUE GROUP =   2   ISSUE =   6   CONT FAILURE PRESS. (T<500F B VB)

     LEVEL 1 NO.<MED.=  1 NO. EXP.=  1     NO.>=MED.=  1 NO. EXP.=  1    TEST CANNOT BE RUN; EXP. NO. < 3
     LEVEL 2 NO.<MED.=  7 NO. EXP.=  5     NO.>=MED.=  4 NO. EXP.=  6   CHI-SQ.=   1.5 DF= 1 SIG.= 0.226
     LEVEL 3 NO.<MED.=  5 NO. EXP.= 10     NO.>=MED.= 15 NO. EXP.= 10   CHI-SQ.=   5.0 DF= 1 SIG.= 0.025
     LEVEL 4 NO.<MED.=  6 NO. EXP.=  4     NO.>=MED.=  3 NO. EXP.=  5   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 5 NO.<MED.= 11 NO. EXP.= 11     NO.>=MED.= 11 NO. EXP.= 11   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 6 NO.<MED.= 20 NO. EXP.= 19     NO.>=MED.= 18 NO. EXP.= 19   CHI-SQ.=   0.1 DF= 1 SIG.= 0.746
     LEVEL 7 NO.<MED.= 10 NO. EXP.= 10     NO.>=MED.= 10 NO. EXP.= 10   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 8 NO.<MED.= 10 NO. EXP.=  8     NO.>=MED.=  6 NO. EXP.=  8   CHI-SQ.=   1.0 DF= 1 SIG.= 0.317
     LEVEL 9 NO.<MED.=  4 NO. EXP.=  6     NO.>=MED.=  8 NO. EXP.=  6   CHI-SQ.=   1.3 DF= 1 SIG.= 0.248
     OVERALL CHI-SQ=   8.9 DF= 15  SIG.= 0.882

0    ISSUE GROUP =   2   ISSUE =   7   LATE FAILURE LOCATION (800-1200 A VB)

     LEVEL 1 NO.<MED.=  2 NO. EXP.=  2     NO.>=MED.=  3 NO. EXP.=  3    TEST CANNOT BE RUN; EXP. NO. < 3
     LEVEL 2 NO.<MED.= 43 NO. EXP.= 47     NO.>=MED.= 51 NO. EXP.= 47   CHI-SQ.=   0.7 DF= 1 SIG.= 0.409
     LEVEL 3 NO.<MED.= 29 NO. EXP.= 25     NO.>=MED.= 22 NO. EXP.= 26   CHI-SQ.=   1.3 DF= 1 SIG.= 0.263
     OVERALL CHI-SQ=   1.9 DF=  3  SIG.= 0.586

0    ISSUE GROUP =   2   ISSUE =   8   CONT FAILURE SIZE, RAPID PRESS.
```

226

```
     LEVEL 1 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 2 NO.<MED.= 67 NO. EXP.= 67     NO.>=MED.= 68 NO. EXP.= 68   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   0.0 DF=  3  SIG.= 1.000

0    ISSUE GROUP =   2   ISSUE =   9   CONT FAILURE SIZE, SLOW PRESS.

     LEVEL 1 NO.<MED.= 38 NO. EXP.= 37     NO.>=MED.= 37 NO. EXP.= 38   CHI-SQ.=   0.1 DF= 1 SIG.= 0.817
     LEVEL 2 NO.<MED.= 36 NO. EXP.= 37     NO.>=MED.= 39 NO. EXP.= 38   CHI-SQ.=   0.1 DF= 1 SIG.= 0.817
     OVERALL CHI-SQ=   0.1 DF=  3  SIG.= 0.991

0    ISSUE GROUP =   2   ISSUE =  10   VB MODE, HIGH-P FLOW MELT

     LEVEL 1 NO.<MED.= 29 NO. EXP.= 37     NO.>=MED.= 46 NO. EXP.= 38   CHI-SQ.=   3.4 DF= 1 SIG.= 0.065
     LEVEL 2 NO.<MED.= 45 NO. EXP.= 37     NO.>=MED.= 30 NO. EXP.= 38   CHI-SQ.=   3.4 DF= 1 SIG.= 0.065
     OVERALL CHI-SQ=   6.8 DF=  3  SIG.= 0.078

0    ISSUE GROUP =   2   ISSUE =  11   CONT PRESS. BEFORE VB, LONG TERM TB

     LEVEL 1 NO.<MED.= 12 NO. EXP.=  8     NO.>=MED.=  4 NO. EXP.=  8   CHI-SQ.=   4.0 DF= 1 SIG.= 0.046
     LEVEL 2 NO.<MED.= 39 NO. EXP.= 40     NO.>=MED.= 41 NO. EXP.= 40   CHI-SQ.=   0.1 DF= 1 SIG.= 0.623
     LEVEL 3 NO.<MED.= 20 NO. EXP.= 25     NO.>=MED.= 30 NO. EXP.= 25   CHI-SQ.=   2.0 DF= 1 SIG.= 0.157
     LEVEL 4 NO.<MED.=  3 NO. EXP.=  2     NO.>=MED.=  1 NO. EXP.=  2    TEST CANNOT BE RUN; EXP. NO. < 3
     OVERALL CHI-SQ=   6.1 DF=  5  SIG.= 0.301

0    ISSUE GROUP =   2   ISSUE =  12   PRESSURE RISE AT VB

     LEVEL 1 NO.<MED.= 14 NO. EXP.= 15     NO.>=MED.= 16 NO. EXP.= 15   CHI-SQ.=   0.1 DF= 1 SIG.= 0.715
     LEVEL 2 NO.<MED.= 25 NO. EXP.= 22     NO.>=MED.= 20 NO. EXP.= 23   CHI-SQ.=   0.8 DF= 1 SIG.= 0.371
     LEVEL 3 NO.<MED.= 22 NO. EXP.= 19     NO.>=MED.= 16 NO. EXP.= 19   CHI-SQ.=   0.9 DF= 1 SIG.= 0.330
     LEVEL 4 NO.<MED.=  8 NO. EXP.= 11     NO.>=MED.= 14 NO. EXP.= 11   CHI-SQ.=   1.6 DF= 1 SIG.= 0.201
     LEVEL 5 NO.<MED.=  5 NO. EXP.=  7     NO.>=MED.= 10 NO. EXP.=  8   CHI-SQ.=   1.1 DF= 1 SIG.= 0.301
     OVERALL CHI-SQ=   4.6 DF=  9  SIG.= 0.869

0    ISSUE GROUP =   2   ISSUE =  13   DELTA P DUE TO SUMP WATER INTERACT.

     LEVEL 1 NO.<MED.= 25 NO. EXP.= 30     NO.>=MED.= 35 NO. EXP.= 30   CHI-SQ.=   1.7 DF= 1 SIG.= 0.197
     LEVEL 2 NO.<MED.= 42 NO. EXP.= 37     NO.>=MED.= 33 NO. EXP.= 38   CHI-SQ.=   1.3 DF= 1 SIG.= 0.248
     LEVEL 3 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   3.0 DF=  5  SIG.= 0.700

0    ISSUE GROUP =   2   ISSUE =  14   PROB OF DRY DW MELT THROUGH

     LEVEL 1 NO.<MED.= 22 NO. EXP.= 37     NO.>=MED.= 53 NO. EXP.= 38   CHI-SQ.=  12.0 DF= 1 SIG.= 0.001
     LEVEL 2 NO.<MED.= 52 NO. EXP.= 37     NO.>=MED.= 23 NO. EXP.= 38   CHI-SQ.=  12.0 DF= 1 SIG.= 0.001
     OVERALL CHI-SQ=  24.0 DF=  3  SIG.= 0.000

0    ISSUE GROUP =   2   ISSUE =  15   PROB OF WET DW MELT THROUGH

     LEVEL 1 NO.<MED.= 30 NO. EXP.= 30     NO.>=MED.= 30 NO. EXP.= 30   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 2 NO.<MED.= 44 NO. EXP.= 45     NO.>=MED.= 46 NO. EXP.= 45   CHI-SQ.=   0.0 DF= 1 SIG.= 0.833
     OVERALL CHI-SQ=   0.0 DF=  3  SIG.= 0.998

0    ISSUE GROUP =   2   ISSUE =  16   PROB OF DW M-THRU W/HI-P MELT EJECT

     LEVEL 1 NO.<MED.= 38 NO. EXP.= 37     NO.>=MED.= 37 NO. EXP.= 38   CHI-SQ.=   0.1 DF= 1 SIG.= 0.817
     LEVEL 2 NO.<MED.= 36 NO. EXP.= 37     NO.>=MED.= 39 NO. EXP.= 38   CHI-SQ.=   0.1 DF= 1 SIG.= 0.817
     OVERALL CHI-SQ=   0.1 DF=  3  SIG.= 0.991

0    ISSUE GROUP =   2   ISSUE =  17   PROB OF H2 BURNS IN RB LEADING TO BP

     LEVEL 1 NO.<MED.=  9 NO. EXP.= 15     NO.>=MED.= 21 NO. EXP.= 15   CHI-SQ.=   4.8 DF= 1 SIG.= 0.028
     LEVEL 2 NO.<MED.= 65 NO. EXP.= 60     NO.>=MED.= 55 NO. EXP.= 60   CHI-SQ.=   0.8 DF= 1 SIG.= 0.361
     OVERALL CHI-SQ=   5.6 DF=  3  SIG.= 0.131

0    ISSUE GROUP =   3   ISSUE =   1   IN-VES RELEASE FROM FUEL

     LEVEL 1 NO.<MED.= 15 NO. EXP.= 17     NO.>=MED.= 19 NO. EXP.= 17   CHI-SQ.=   0.5 DF= 1 SIG.= 0.493
     LEVEL 2 NO.<MED.= 39 NO. EXP.= 37     NO.>=MED.= 35 NO. EXP.= 37   CHI-SQ.=   0.2 DF= 1 SIG.= 0.642
     LEVEL 3 NO.<MED.= 19 NO. EXP.= 19     NO.>=MED.= 20 NO. EXP.= 20   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 4 NO.<MED.=  1 NO. EXP.=  1     NO.>=MED.=  2 NO. EXP.=  2    TEST CANNOT BE RUN; EXP. NO. < 3
     OVERALL CHI-SQ=   0.7 DF=  5  SIG.= 0.984

0    ISSUE GROUP =   3   ISSUE =   2   CSI DECOMP

     LEVEL 1 NO.<MED.= 15 NO. EXP.= 14     NO.>=MED.= 14 NO. EXP.= 15   CHI-SQ.=   0.1 DF= 1 SIG.= 0.710
     LEVEL 2 NO.<MED.= 27 NO. EXP.= 27     NO.>=MED.= 28 NO. EXP.= 28   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 3 NO.<MED.= 23 NO. EXP.= 25     NO.>=MED.= 28 NO. EXP.= 26   CHI-SQ.=   0.3 DF= 1 SIG.= 0.575
     LEVEL 4 NO.<MED.=  9 NO. EXP.=  7     NO.>=MED.=  6 NO. EXP.=  8   CHI-SQ.=   1.1 DF= 1 SIG.= 0.301
     OVERALL CHI-SQ=   1.5 DF=  7  SIG.= 0.981

0    ISSUE GROUP =   3   ISSUE =   3   FRAC IN-VES RETENTION LEAKED, AT VB

     LEVEL 1 NO.<MED.=  8 NO. EXP.=  7     NO.>=MED.=  6 NO. EXP.=  7   CHI-SQ.=   0.3 DF= 1 SIG.= 0.593
     LEVEL 2 NO.<MED.= 26 NO. EXP.= 29     NO.>=MED.= 32 NO. EXP.= 29   CHI-SQ.=   0.6 DF= 1 SIG.= 0.431
     LEVEL 3 NO.<MED.= 16 NO. EXP.= 18     NO.>=MED.= 20 NO. EXP.= 18   CHI-SQ.=   0.4 DF= 1 SIG.= 0.505
     LEVEL 4 NO.<MED.= 20 NO. EXP.= 17     NO.>=MED.= 15 NO. EXP.= 18   CHI-SQ.=   1.0 DF= 1 SIG.= 0.310
     LEVEL 5 NO.<MED.=  4 NO. EXP.=  3     NO.>=MED.=  3 NO. EXP.=  4   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   2.4 DF=  9  SIG.= 0.984

0    ISSUE GROUP =   3   ISSUE =   4   S POOL DF

     LEVEL 1 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
     LEVEL 2 NO.<MED.= 40 NO. EXP.= 38     NO.>=MED.= 36 NO. EXP.= 36   CHI-SQ.=   0.2 DF= 1 SIG.= 0.646
     LEVEL 3 NO.<MED.= 14 NO. EXP.= 15     NO.>=MED.= 16 NO. EXP.= 15   CHI-SQ.=   0.1 DF= 1 SIG.= 0.715
     LEVEL 4 NO.<MED.= 11 NO. EXP.= 12     NO.>=MED.= 13 NO. EXP.= 12   CHI-SQ.=   0.2 DF= 1 SIG.= 0.683
     LEVEL 5 NO.<MED.=  3 NO. EXP.=  2     NO.>=MED.=  2 NO. EXP.=  3    TEST CANNOT BE RUN; EXP. NO. < 3
     OVERALL CHI-SQ=   0.8 DF=  7  SIG.= 0.998

0    ISSUE GROUP =   3   ISSUE =   5   S POOL DF, VOL I
```

```
      LEVEL 1 NO.<MED.=  2 NO. EXP.=  2     NO.>=MED.=  2 NO. EXP.=  2    TEST CANNOT BE RUN; EXP. NO. < 3
      LEVEL 2 NO.<MED.= 19 NO. EXP.= 17     NO.>=MED.= 16 NO. EXP.= 18   CHI-SQ.=   0.5 DF= 1 SIG.= 0.499
      LEVEL 3 NO.<MED.= 21 NO. EXP.= 23     NO.>=MED.= 25 NO. EXP.= 23   CHI-SQ.=   0.3 DF= 1 SIG.= 0.555
      LEVEL 4 NO.<MED.= 26 NO. EXP.= 25     NO.>=MED.= 24 NO. EXP.= 25   CHI-SQ.=   0.1 DF= 1 SIG.= 0.777
      LEVEL 5 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
      OVERALL CHI-SQ=   1.2 DF=  7  SIG.= 0.992

0     ISSUE GROUP =   3   ISSUE =   6   REVOL FROM RPV (FRVOL)

      LEVEL 1 NO.<MED.=  3 NO. EXP.=  2     NO.>=MED.=  1 NO. EXP.=  2    TEST CANNOT BE RUN; EXP. NO. < 3
      LEVEL 2 NO.<MED.= 24 NO. EXP.= 23     NO.>=MED.= 23 NO. EXP.= 24   CHI-SQ.=   0.1 DF= 1 SIG.= 0.770
      LEVEL 3 NO.<MED.= 40 NO. EXP.= 38     NO.>=MED.= 36 NO. EXP.= 38   CHI-SQ.=   0.2 DF= 1 SIG.= 0.646
      LEVEL 4 NO.<MED.=  7 NO. EXP.= 11     NO.>=MED.= 16 NO. EXP.= 12   CHI-SQ.=   2.8 DF= 1 SIG.= 0.095
      OVERALL CHI-SQ=   3.1 DF=  5  SIG.= 0.687

0     ISSUE GROUP =   3   ISSUE =   7   CCI REL

      LEVEL 1 NO.<MED.= 12 NO. EXP.=  9     NO.>=MED.=  6 NO. EXP.=  9   CHI-SQ.=   2.0 DF= 1 SIG.= 0.157
      LEVEL 2 NO.<MED.= 34 NO. EXP.= 31     NO.>=MED.= 28 NO. EXP.= 31   CHI-SQ.=   0.6 DF= 1 SIG.= 0.446
      LEVEL 3 NO.<MED.= 24 NO. EXP.= 27     NO.>=MED.= 31 NO. EXP.= 28   CHI-SQ.=   0.7 DF= 1 SIG.= 0.418
      LEVEL 4 NO.<MED.=  4 NO. EXP.=  7     NO.>=MED.= 11 NO. EXP.=  8   CHI-SQ.=   2.4 DF= 1 SIG.= 0.120
      OVERALL CHI-SQ=   5.6 DF=  7  SIG.= 0.582

0     ISSUE GROUP =   3   ISSUE =   8   RB DF

      LEVEL 1 NO.<MED.= 18 NO. EXP.= 12     NO.>=MED.=  7 NO. EXP.= 13   CHI-SQ.=   5.8 DF= 1 SIG.= 0.016
      LEVEL 2 NO.<MED.= 32 NO. EXP.= 29     NO.>=MED.= 26 NO. EXP.= 29   CHI-SQ.=   0.6 DF= 1 SIG.= 0.431
      LEVEL 3 NO.<MED.= 19 NO. EXP.= 26     NO.>=MED.= 33 NO. EXP.= 26   CHI-SQ.=   3.8 DF= 1 SIG.= 0.052
      LEVEL 4 NO.<MED.=  5 NO. EXP.=  7     NO.>=MED.= 10 NO. EXP.=  8   CHI-SQ.=   1.1 DF= 1 SIG.= 0.301
      OVERALL CHI-SQ=  11.2 DF=  7  SIG.= 0.129

0     ISSUE GROUP =   3   ISSUE =   9   REF BAY DF

      LEVEL 1 NO.<MED.=  6 NO. EXP.=  6     NO.>=MED.=  6 NO. EXP.=  6   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
      LEVEL 2 NO.<MED.= 15 NO. EXP.= 13     NO.>=MED.= 12 NO. EXP.= 14   CHI-SQ.=   0.6 DF= 1 SIG.= 0.441
      LEVEL 3 NO.<MED.= 25 NO. EXP.= 28     NO.>=MED.= 32 NO. EXP.= 29   CHI-SQ.=   0.6 DF= 1 SIG.= 0.427
      LEVEL 4 NO.<MED.= 28 NO. EXP.= 27     NO.>=MED.= 26 NO. EXP.= 27   CHI-SQ.=   0.1 DF= 1 SIG.= 0.785
      OVERALL CHI-SQ=   1.3 DF=  7  SIG.= 0.988

0     ISSUE GROUP =   3   ISSUE =  10   LATE RELEASE FRACT, IODINE

      LEVEL 1 NO.<MED.=  4 NO. EXP.=  3     NO.>=MED.=  3 NO. EXP.=  4   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
      LEVEL 2 NO.<MED.= 23 NO. EXP.= 24     NO.>=MED.= 26 NO. EXP.= 25   CHI-SQ.=   0.1 DF= 1 SIG.= 0.775
      LEVEL 3 NO.<MED.= 37 NO. EXP.= 36     NO.>=MED.= 36 NO. EXP.= 37   CHI-SQ.=   0.1 DF= 1 SIG.= 0.815
      LEVEL 4 NO.<MED.= 10 NO. EXP.= 10     NO.>=MED.= 11 NO. EXP.= 11   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
      OVERALL CHI-SQ=   0.1 DF=  7  SIG.= 1.000

0     ISSUE GROUP =   3   ISSUE =  11   DUMMY ISSUE
```

```
     LEVEL 1 NO.<MED.= 40 NO. EXP.= 37     NO.>=MED.= 35 NO. EXP.= 38   CHI-SQ.=   0.5 DF= 1 SIG.= 0.488
     LEVEL 2 NO.<MED.= 34 NO. EXP.= 37     NO.>=MED.= 41 NO. EXP.= 38   CHI-SQ.=   0.5 DF= 1 SIG.= 0.488
     OVERALL CHI-SQ=   1.0 DF=  3  SIG.= 0.811

0    ISSUE GROUP =   3   ISSUE =  12   DUMMY ISSUE

     LEVEL 1 NO.<MED.= 19 NO. EXP.= 25     NO.>=MED.= 31 NO. EXP.= 25   CHI-SQ.=   2.9 DF= 1 SIG.= 0.090
     LEVEL 2 NO.<MED.= 28 NO. EXP.= 25     NO.>=MED.= 22 NO. EXP.= 25   CHI-SQ.=   0.7 DF= 1 SIG.= 0.396
     LEVEL 3 NO.<MED.= 27 NO. EXP.= 25     NO.>=MED.= 23 NO. EXP.= 25   CHI-SQ.=   0.3 DF= 1 SIG.= 0.572
     OVERALL CHI-SQ=   3.9 DF=  5  SIG.= 0.561

0    ISSUE GROUP =   3   ISSUE =  13   DUMMY ISSUE

     LEVEL 1 NO.<MED.= 20 NO. EXP.= 19     NO.>=MED.= 18 NO. EXP.= 19   CHI-SQ.=   0.1 DF= 1 SIG.= 0.746
     LEVEL 2 NO.<MED.= 15 NO. EXP.= 18     NO.>=MED.= 22 NO. EXP.= 19   CHI-SQ.=   1.0 DF= 1 SIG.= 0.324
     LEVEL 3 NO.<MED.= 18 NO. EXP.= 19     NO.>=MED.= 20 NO. EXP.= 19   CHI-SQ.=   0.1 DF= 1 SIG.= 0.746
     LEVEL 4 NO.<MED.= 21 NO. EXP.= 18     NO.>=MED.= 16 NO. EXP.= 19   CHI-SQ.=   1.0 DF= 1 SIG.= 0.324
     OVERALL CHI-SQ=   2.2 DF=  7  SIG.= 0.951

0    ISSUE GROUP =   3   ISSUE =  14   DUMMY ISSUE

     LEVEL 1 NO.<MED.= 13 NO. EXP.= 15     NO.>=MED.= 17 NO. EXP.= 15   CHI-SQ.=   0.5 DF= 1 SIG.= 0.465
     LEVEL 2 NO.<MED.= 16 NO. EXP.= 15     NO.>=MED.= 14 NO. EXP.= 15   CHI-SQ.=   0.1 DF= 1 SIG.= 0.715
     LEVEL 3 NO.<MED.= 13 NO. EXP.= 15     NO.>=MED.= 17 NO. EXP.= 15   CHI-SQ.=   0.5 DF= 1 SIG.= 0.465
     LEVEL 4 NO.<MED.= 16 NO. EXP.= 15     NO.>=MED.= 14 NO. EXP.= 15   CHI-SQ.=   0.1 DF= 1 SIG.= 0.715
     LEVEL 5 NO.<MED.= 16 NO. EXP.= 15     NO.>=MED.= 14 NO. EXP.= 15   CHI-SQ.=   0.1 DF= 1 SIG.= 0.715
     OVERALL CHI-SQ=   1.5 DF=  9  SIG.= 0.997
```

```
 CONSEQUENCE MEASURE:  EARLY FATALITIES
DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS

     SELECTION NO.   1       1-TH FROM BOTTOM     SAMPLE MEMBER 125  RISK= 6.101E-10
     ISSUE LEVELS:   3 2 3 2 3    2 4 3 1 1    8 3 1 2 2    3 4 2 2 2    1 2 2 2 4    2 2 2 2 2    1 2 1 2 2
1 1

     SEQ.          FREQ.      CFM                          PROB.      REL  CONS.   CONTRIB.

     TB          1.57E-06                                                          2.43E-10
                              FCACCCGBFDBCCDDBHHABBB       0.0129      4  2.55E-03  5.18E-11
                              FCACCCGGEDBCBABBDEABBB       0.2820      3  3.16E-04  1.40E-10
                              FCBBAAGCFBBBCBBBHHABBB       0.0256      3  3.16E-04  1.27E-11
                              FCBBACGCFBBBCBBBHHABBB       0.0258      3  3.16E-04  1.28E-11
                              FCCBAAGCFBBBCBBBHHABBB       0.0512      3  3.16E-04  2.54E-11

     TCSRX2      7.40E-07                                                          3.67E-10
                              DAAAACGBFABCCBBBHHABBB       0.4433     22  1.11E-03  3.64E-10
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TB               0.40
     TCSRX2           0.60
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     DAAAACGBFABCCBBBHHABBB        0.60
     FCACCCGBFDBCCDDBHHABBB        0.08
     FCACCCGGEDBCBABBDEABBB        0.23
     FCBBAAGCFBBBCBBBHHABBB        0.02
     FCBBACGCFBBBCBBBHHABBB        0.02
     FCCBAAGCFBBBCBBBHHABBB        0.04
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  3D          0.31
     PCH  4D          0.08
     PCH 22D          0.60
1    CONSEQUENCE MEASURE:  EARLY FATALITIES

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS

     SELECTION NO.   2       2-TH FROM BOTTOM     SAMPLE MEMBER   4  RISK= 1.622E-09
     ISSUE LEVELS:   2 2 2 1 1    2 3 3 4 1    6 3 2 2 2    1 2 1 2 2    2 2 2 2
 2    2 4 3 3 2    2 2 1 2 4    5 7

     SEQ.          FREQ.      CFM                          PROB.      REL  CONS.   CONTRIB.

     TB          2.73E-07                                                          1.22E-10
                              FCACCCFGFDBCBABBGFABBB       0.0415      3  3.16E-04  3.57E-12
                              FCACCCGGEDBCBABBGFABBB       0.1238      4  2.55E-03  9.61E-11
                              FCBBAAGCFBBCCBBBHHABBB       0.0723      3  3.16E-04  6.22E-12
                              FCBBACGCFBBCCBBBHHABBB       0.0728      3  3.16E-04  6.27E-12
                              FCCBAAGCFBBBCBBBHHABBB       0.0854      3  3.16E-04  7.36E-12
                              FCCBAAGCFBBCCBBBHHABBB       0.1443      3  3.16E-04  1.24E-11

     TCSX        6.93E-08                                                          2.93E-10
                              BAACACGGDAACBABBDDABBB       0.0320     31  1.32E-01  2.92E-10

     TCSRV23     2.02E-08                                                          1.21E-09
                              DABAACGADDACBBBBHGABAB       0.1843     41  1.55E-01  5.77E-10
                              DACAAAGADABCCBBBHHABBB       0.3793     29  8.22E-02  6.30E-10
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TB               0.08
     TCSX             0.18
     TCSRV23          0.74
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     BAACACGGDAACBABBDDABBB        0.18
     DABAACGADDACBBBBHGABAB        0.36
     DACAAAGADABCCBBBHHABBB        0.39
     FCACCCGGEDBCBABBGFABBB        0.05
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  3D          0.02
     PCH  4D          0.05
     PCH 29D          0.39
     PCH 31D          0.18
     PCH 41D          0.36
1    CONSEQUENCE MEASURE:  EARLY FATALITIES
```

```
      DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS

      SELECTION NO.   3      3-TH FROM BOTTOM     SAMPLE MEMBER 133  RISK= 3.038E-09
      ISSUE LEVELS:   3 2 2 1 3    3 3 2 3 1    5 3 2 2 2    1 2 3 2 2    2 2 2 1 4    2 4 3 2 2    4 1 2 2 2
3 4

      SEQ.          FREQ.      CFM                           PROB.     REL  CONS.    CONTRIB.

      TB          1.57E-06                                                          1.26E-10
                               FCACCCGGEDBCBABBGEABBB        0.2528      3  3.16E-04  1.26E-10

      TCSRX2      6.75E-07                                                          2.91E-09
                               CAACAABGFDACBCCBADABAB        0.0602     12  1.04E-03  4.22E-11
                               CAACAABGFDACBCCBAEABAB        0.0602     12  1.04E-03  4.22E-11
                               CAACACBGFDACBCCBADABAB        0.0328     21  2.05E-02  4.54E-10
                               CAACACBGFDACBCCBAEABAB        0.0328     21  2.05E-02  4.54E-10
                               DAAAAAGBFABCCBBBHHABBB        0.3383     12  1.04E-03  2.37E-10
                               DAAAAAGBFDACCBBBHHABBB        0.1557     12  1.04E-03  1.09E-10
                               DAAAAAGGDDACBBBBAEABAB        0.0193     15  4.74E-03  6.18E-11
                               DAAAACGBFABCCBBBHHABBB        0.3383     19  3.17E-03  7.24E-10
                               DAAAACGGDDACBBBBAEABAB        0.0193     28  6.04E-02  7.87E-10
0     EARLY FATALITIES

      FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
      TB              0.04
      TCSRX2          0.96
0     EARLY FATALITIES

      FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
      CAACAABGFDACBCCBADABAB       0.01
      CAACAABGFDACBCCBAEABAB       0.01
      CAACACBGFDACBCCBADABAB       0.15
      CAACACBGFDACBCCBAEABAB       0.15
      DAAAAAGBFABCCBBBHHABBB       0.08
      DAAAAAGBFDACCBBBHHABBB       0.04
      DAAAAAGGDDACBBBBAEABAB       0.02
      DAAAACGBFABCCBBBHHABBB       0.24
      DAAAACGGDDACBBBBAEABAB       0.26
      FCACCCGGEDBCBABBGEABBB       0.04
0     EARLY FATALITIES

      FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
      PCH  3D         0.04
      PCH 12D         0.14
      PCH 15D         0.02
      PCH 19D         0.24
      PCH 21D         0.30
      PCH 28D         0.26
1     CONSEQUENCE MEASURE:  EARLY FATALITIES

      DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS

      SELECTION NO.   4      4-TH FROM BOTTOM     SAMPLE MEMBER 104  RISK= 5.940E-09
      ISSUE LEVELS:   2 1 2 2 1    4 1 3 3 1    3 3 1 2 2    2 2 2 2 1    2 2 1 2 2    3 4 3 2 1    4 3 2 3 1
3 2

      SEQ.          FREQ.      CFM                           PROB.     REL  CONS.    CONTRIB.

      TCSX        6.93E-08                                                          7.49E-10
                               BAACAAGBFAACCBBBHHABBB        0.4570     19  3.17E-03  1.00E-10
                               BAACACGBFAACCBBBHHABBB        0.4570     21  2.05E-02  6.49E-10

      TCSRX2      2.02E-07                                                          5.14E-09
                               CAACAABGFDACBCCBADABAB        0.1251     15  4.74E-03  1.20E-10
                               CAACAABGFDACBCCBAEABAB        0.1251     15  4.74E-03  1.20E-10
                               CAACACBGFDACBCCBADABAB        0.0682     28  6.04E-02  8.33E-10
                               CAACACBGFDACBCCBAEABAB        0.0682     28  6.04E-02  8.33E-10
                               CAACACBGFDACBCDBAEABAB        0.0569     28  6.04E-02  6.95E-10
                               DAAAAAGBFDACCBBBHHABBB        0.3240     22  1.11E-03  7.27E-11
                               DAAAACGBFDACCBBBHHABBB        0.3240     24  3.77E-02  2.47E-09
0     EARLY FATALITIES

      FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
      TCSX            0.13
      TCSRX2          0.87
0     EARLY FATALITIES

      FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
      BAACAAGBFAACCBBBHHABBB       0.02
      BAACACGBFAACCBBBHHABBB       0.11
      CAACAABGFDACBCCBADABAB       0.02
      CAACAABGFDACBCCBAEABAB       0.02
      CAACACBGFDACBCCBADABAB       0.14
```

```
     CAACACBGFDACBCCBAEABAB        0.14
     CAACACBGFDACBCDBAEABAB        0.12
     DAAAAAGBFDACCBBBHHABBB        0.01
     DAAAACGBFDACCBBBHHABBB        0.42
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH 15D          0.04
     PCH 19D          0.02
     PCH 21D          0.11
     PCH 22D          0.01
     PCH 24D          0.42
     PCH 28D          0.40
1    CONSEQUENCE MEASURE:  EARLY FATALITIES

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.   5       5-TH FROM BOTTOM      SAMPLE MEMBER  18  RISK= 7.073E-09
     ISSUE LEVELS:   3 1 3 2 4    2 1 3 3 1    7 3 2 2 2    1 3 1 2 1    1 2 2 2 2    2 3 4 2 2    3 2 2 1 1
1 7

     SEQ.          FREQ.       CFM                             PROB.      REL  CONS.   CONTRIB.

     TB           3.32E-06                                                         3.88E-09
                               FCACCCGGEDBCBABBGEABBB      0.4518     4  2.55E-03  3.82E-09

     TCSRV23      7.40E-08                                                         3.19E-09
                               DABAACGADDACBBBBHGABAB      0.5250    29  8.22E-02  3.19E-09
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TB               0.55
     TCSRV23          0.45
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     DABAACGADDACBBBBHGABAB        0.45
     FCACCCGGEDBCBABBGEABBB        0.54
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  4D          0.54
     PCH 29D          0.45
1    CONSEQUENCE MEASURE:  EARLY FATALITIES

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.   6       6-TH FROM BOTTOM      SAMPLE MEMBER 140  RISK= 7.111E-09
     ISSUE LEVELS:   2 3 1 1 3    3 3 4 3 2    5 2 2 1 2    3 3 2 1 2    2 2 3 2 4    2 3 3 2 1    3 2 1 3 4
2 4

     SEQ.          FREQ.       CFM                             PROB.      REL  CONS.   CONTRIB.

     TB           1.57E-06                                                         1.68E-09
                               FCACCCGGDDBCBABBDEABBB      0.4007     4  2.55E-03  1.61E-09
                               FCCBAAGCFBBCCBBBHHABBB      0.1409     3  3.16E-04  7.00E-11

     TBUX         2.69E-06                                                         5.43E-09
                               EBACCCGGDDBBBABBFEABBB      0.0490     4  2.55E-03  3.36E-10
                               EBACCCGGDDBCBABBFEABBB      0.7433     4  2.55E-03  5.10E-09
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TB               0.24
     TBUX             0.76
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     EBACCCGGDDBBBABBFEABBB        0.05
     EBACCCGGDDBCBABBFEABBB        0.72
     FCACCCGGDDBCBABBDEABBB        0.23
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  4D          0.99
1    CONSEQUENCE MEASURE:  EARLY FATALITIES

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.   7       7-TH FROM BOTTOM      SAMPLE MEMBER  31  RISK= 7.955E-09
     ISSUE LEVELS:   3 3 3 1 1    1 2 2 3 1    4 3 2 1 2    2 2 2 2 1    2 2 3 1 2    2 2 3 1 2    4 3 1 2 1
2 1
```

```
     SEQ.          FREQ.       CFM                          PROB.      REL  CONS.  CONTRIB.

     TBUX        2.24E-06                                                          6.60E-09
                               EBACCCFGFDBCBABBFEABBB       0.3193      4  2.55E-03 1.82E-09
                               EBACCCGGEDBCBABBFEABBB       0.1084      5  1.95E-02 4.74E-09

     TCSRV23     7.40E-08                                                          1.35E-09
                               DABAACGADDACBBBBHGABAB       0.4709     24  3.77E-02 1.31E-09
                               DACAAAGADDACCBBBBHHABBB      0.4957     22  1.11E-03 4.07E-11
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TBUX             0.83
     TCSRV23          0.17
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     DABAACGADDACBBBBHGABAB      0.17
     EBACCCFGFDBCBABBFEABBB      0.23
     EBACCCGGEDBCBABBFEABBB      0.60
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  4D          0.23
     PCH  5D          0.60
     PCH 24D          0.17
1    CONSEQUENCE MEASURE:  EARLY FATALITIES

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.   8      8-TH FROM BOTTOM     SAMPLE MEMBER  17  RISK= 8.482E-09
     ISSUE LEVELS:   2 2 3 1 1   3 2 3 2 1   6 2 2 2 1   3 5 2 1 1   1 2 2 3 5   4 3 3 1 2   4 2 2 3 1
5 2

     SEQ.          FREQ.       CFM                          PROB.      REL  CONS.  CONTRIB.

     TB          2.73E-07                                                          1.09E-09
                               FCACCCGGDDBCBABBDABABB       0.0245      5  1.95E-02 1.30E-10
                               FCACCCGGDDBCBABBDBBABB       0.1212      5  1.95E-02 6.44E-10
                               FCBBAAGCDBBCBBBBHHABBB       0.1088      4  2.55E-03 7.56E-11
                               FCBBACGCDBBCBBBBHHABBB       0.1096      4  2.55E-03 7.62E-11
                               FCCBAAGCFBBCCBBBHHABBB       0.2175      4  2.55E-03 1.51E-10

     TBUX        3.16E-08                                                          2.92E-10
                               EBACCCGGDDBCBABBFBBABB       0.4737      5  1.95E-02 2.92E-10

     TBU         6.37E-08                                                          4.44E-10
                               EBAACCGGDDBCBABBEHBBBB       0.3578      5  1.95E-02 4.44E-10

     TCSX        6.93E-08                                                          8.68E-10
                               BAACACGBDAACBBBBHHABBB       0.3323     24  3.77E-02 8.68E-10

     TCUX        3.65E-07                                                          2.43E-10
                               AAACAAGGDABCBABBECABBB       0.2420     12  1.04E-03 9.18E-11
                               AABBAAGGDABCBABBDGABBB       0.0356     12  1.04E-03 1.35E-11
                               AABBAAGGDABCBABBFGABBB       0.0356     12  1.04E-03 1.35E-11
                               AABBACGGDABCBABBFGABBB       0.0831     19  3.17E-03 9.61E-11
                               AABBACGGDABCBABBFGBBBB       0.0235     19  3.17E-03 2.72E-11

     TCSRV23     2.22E-08                                                          5.55E-09
                               DABAAAGADDACBBBBHGABAB       0.4137     29  8.22E-02 7.53E-10
                               DABAACGADDACBBBBHGABAB       0.4137     37  5.23E-01 4.79E-09
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TB               0.13
     TBUX             0.03
     TBU              0.05
     TCSX             0.10
     TCUX             0.03
     TCSRV23          0.65
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     AAACAAGGDABCBABBECABBB      0.01
     AABBACGGDABCBABBFGABBB      0.01
     BAACACGBDAACBBBBHHABBB      0.10
     DABAAAGADDACBBBBHGABAB      0.09
     DABAACGADDACBBBBHGABAB      0.57
     EBAACCGGDDBCBABBEHBBBB      0.05
     EBACCCGGDDBCBABBFBBABB      0.03
     FCACCCGGDDBCBABBDABABB      0.02
     FCACCCGGDDBCBABBDBBABB      0.08
     FCCBAAGCFBBCCBBBHHABBB      0.02
0    EARLY FATALITIES
```

```
     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  4D          0.04
     PCH  5D          0.18
     PCH 12D          0.01
     PCH 19D          0.01
     PCH 24D          0.10
     PCH 29D          0.09
     PCH 37D          0.57
1    CONSEQUENCE MEASURE:  EARLY FATALITIES

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS

     SELECTION NO.  9       9-TH FROM BOTTOM     SAMPLE MEMBER 107  RISK= 8.664E-09
     ISSUE LEVELS:  2 2 2 2 2   2 3 3 3 1   8 2 2 1 1   2 2 1 2 2   1 2 1 2 1   2 3 2 1 1   4 3 2 2 2
2 6

     SEQ.          FREQ.      CFM                           PROB.      REL  CONS.  CONTRIB.

     TB           7.39E-07                                                        7.22E-09
                              FCACCCFGFDBCBADBECBABB        0.0740     4  2.55E-03  1.40E-10
                              FCACCCGGDDBCBACBEABABB        0.0034     8  2.85E-01  7.07E-10
                              FCACCCGGDDBCBADBEABABB        0.0302     8  2.85E-01  6.36E-09

     TBUX         3.58E-08                                                        1.01E-09
                              EBACCCFGFDBCBADBFCBABB        0.2384     4  2.55E-03  2.17E-11
                              EBACCCGGDDBCBADBFABABB        0.0973     8  2.85E-01  9.92E-10

     TCSRX2       2.02E-07                                                        4.32E-10
                              DAAAAAGBFABCCBBBHHABBB        0.4286    19  3.17E-03  2.75E-10
                              DAAAACGBFABCCBBBHHABBB        0.4286    18  1.82E-03  1.58E-10
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TB               0.83
     TBUX             0.12
     TCSRX2           0.05
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     DAAAAAGBFABCCBBBHHABBB       0.03
     DAAAACGBFABCCBBBHHABBB       0.02
     EBACCCGGDDBCBADBFABABB       0.11
     FCACCCFGFDBCBADBECBABB       0.02
     FCACCCGGDDBCBACBEABABB       0.08
     FCACCCGGDDBCBADBEABABB       0.73
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  4D          0.02
     PCH  8D          0.93
     PCH 18D          0.02
     PCH 19D          0.03
1    CONSEQUENCE MEASURE:  EARLY FATALITIES

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.  10      10-TH FROM BOTTOM     SAMPLE MEMBER 138  RISK= 8.686E-09
     ISSUE LEVELS:  3 3 2 2 3   3 3 1 1 1   9 3 2 1 1   1 3 2 2 1   2 2 1 3 2   3 4 2 2 1   2 1 1 3 3
1 8

     SEQ.          FREQ.      CFM                           PROB.      REL  CONS.  CONTRIB.

     TB           1.57E-06                                                        2.09E-09
                              FCACCCGGDDBCBABBGABABB        0.0683     5  1.95E-02  2.09E-09

     TBUX         2.69E-06                                                        6.59E-09
                              EBACCCGGDDBCBABBFABABB        0.1238     5  1.95E-02  6.49E-09
                              EBACCCGGEDBCBABBFBBABB        0.1165     3  3.16E-04  9.90E-11
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TB               0.24
     TBUX             0.76
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     EBACCCGGDDBCBABBFABABB       0.75
     EBACCCGGEDBCBABBFBBABB       0.01
     FCACCCGGDDBCBABBGABABB       0.24
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  3D          0.01
```

```
        PCH  5D          0.99
1       CONSEQUENCE MEASURE:  EARLY FATALITIES

        DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


        SELECTION NO.  11     141-TH FROM BOTTOM     SAMPLE MEMBER 129  RISK= 6.189E-06
        ISSUE LEVELS:   2 2 2 1 4    2 3 2 1 1    9 2 2 1 2    3 1 1 1 1    1 1 2 4 4    2 3 2 3 3    4 2 1 3 4
5 6

        SEQ.           FREQ.      CFM                         PROB.     REL  CONS.  CONTRIB.

        TB          3.32E-06                                                        5.86E-06
                                  FCACCCGBDDBCBDDBHHABBB      0.0737     9  2.94E+00  7.13E-07
                                  FCACCCGGDDBCBADBDGABBB      0.5236     9  2.94E+00  5.11E-06

        TBUX        3.80E-08                                                        1.07E-07
                                  EBACCCGGDDBCBADBFGABBB      0.9599     9  2.94E+00  1.07E-07

        TBU         8.95E-08                                                        1.92E-07
                                  EBAACCGGDDBCBADBEHABBB      0.7280     9  2.94E+00  1.92E-07
0       EARLY FATALITIES

        FRACTIONAL CONTRIFUTIONS OF EACH SEQUENCE
        TB               0.95
        TBUX             0.02
        TBU              0.03
0       EARLY FATALITIES

        FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
        EBAACCGGDDBCBADBEHABBB        0.03
        EBACCCGGDDBCBADBFGABBB        0.02
        FCACCCGBDDBCBDDBHHABBB        0.12
        FCACCCGGDDBCBADBDGABBB        0.82
0       EARLY FATALITIES

        FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
        PCH  9D          0.99
1       CONSEQUENCE MEASURE:  EARLY FATALITIES

        DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


        SELECTION NO.  12     142-TH FROM BOTTOM     SAMPLE MEMBER  74  RISK= 6.599E-06
        ISSUE LEVELS:   4 4 3 2 2    3 2 2 2 1    6 3 2 1 1    2 3 2 1 2    1 2 3 2 4    2 2 3 3 3    3 3 2 1 3
2 8

        SEQ.           FREQ.      CFM                         PROB.     REL  CONS.  CONTRIB.

        TBUX        3.50E-05                                                        6.25E-06
                                  EBACCCGGDDBCBABBFABABB      0.0937     8  2.85E-01  9.36E-07
                                  EBACCCGGDDBCBABBFBBABB      0.4629     8  2.85E-01  4.62E-06
                                  EBACCCGGDDBCBABBFEBBBB      0.0613     8  2.85E-01  6.12E-07

        TCSX        8.46E-07                                                        2.17E-07
                                  BAACACGBDAACBBBBHHABBB      0.3201    36  8.03E-01  2.17E-07

        TCSRV23     2.70E-07                                                        8.39E-08
                                  DABAAAGADDACBBBBHGABAB      0.3505    29  8.22E-02  7.79E-09
                                  DABAACGADDACBBBBHGABAB      0.3505    36  8.03E-01  7.61E-08
0       EARLY FATALITIES

        FRACTIONAL CONTRIPUTIONS OF EACH SEQUENCE
        TBUX             0.95
        TCSX             0.03
        TCSRV23          0.01
0       EARLY FATALITIES

        FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
        BAACACGBDAACBBBBHHABBB        0.03
        DABAACGADDACBBBBHGABAB        0.01
        EBACCCGGDDBCBABBFABABB        0.14
        EBACCCGGDDBCBABBFBBABB        0.70
        EBACCCGGDDBCBABBFEBBBB        0.09
0       EARLY FATALITIES

        FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
        PCH  5D          0.01
        PCH  8D          0.94
        PCH 36D          0.04
1       CONSEQUENCE MEASURE:  EARLY FATALITIES

        DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


        SELECTION NO.  13     143-TH FROM BOTTOM     SAMPLE MEMBER 112  RISK= 8.140E-06
```

```
      ISSUE LEVELS:   3 3 3 2 3   1 3 1 2 1   3 3 2 2 1   3 3 2 1 2   2 1 3 1 4   3 5 2 3 3   3 2 1 3 3
 2 3

      SEQ.          FREQ.       CFM                              PROB.      REL  CONS.  CONTRIB.

      TB           1.57E-06                                                          1.75E-06
                                FCACCCGBDDBCBDDBHHBABB           0.1122      9  2.94E+00  5.19E-07
                                FCACCCGGDDBCBADBDBBABB           0.2642      9  2.94E+00  1.22E-06

      TBUX         2.69E-06                                                          6.23E-06
                                EBACCCGGDDBCBADBFABABB           0.1190      9  2.94E+00  9.41E-07
                                EBACCCGGDDBCBADBFBBABB           0.5877      9  2.94E+00  4.65E-06
                                EBACCCGGDDBCBADBFEBBBB           0.0778      9  2.94E+00  6.15E-07

      TBU          8.07E-C8                                                          1.39E-07
                                EBAACCGGDDBCBADBEHBBBB           0.5839      9  2.94E+00  1.39E-07
 0    EARLY FATALITIES

      FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
      TB                 0.21
      TBUX               0.77
      TBU                0.02
 0    EARLY FATALITIES

      FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
      EBAACCGGDDBCBADBEHBBBB        0.02
      EBACCCGGDDBCBADBFABABB        0.12
      EBACCCGGDDBCBADBFBBABB        0.57
      EBACCCGGDDBCBADBFEBBBB        0.08
      FCACCCGBDDBCBDDBHHBABB        0.06
      FCACCCGGDDBCBADBDBBABB        0.15
 0    EARLY FATALITIES

      FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
      PCH  9D            0.99
 1    CONSEQUENCE MEASURE:  EARLY FATALITIES

      DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


      SELECTION NO.  14     144-TH FROM BOTTOM     SAMPLE MEMBER 108  RISK= 8.230E-06
      ISSUE LEVELS:   2 3 2 1 3   2 3 2 3 1   7 2 2 2 1   2 1 3 1 2   1 2 3 3 2   4 4 2 3 4   2 2 2 1 2
 5 1

      SEQ.          FREQ.       CFM                              PROB.      REL  CONS.  CONTRIB.

      TB           1.57E-06                                                          1.80E-06
                                FCACCCGGDDBCBABBEABABB           0.0655      9  2.94E+00  3.03E-07
                                FCACCCGGDDBCBABBEBBABB           0.3236      9  2.94E+00  1.50E-06

      TBUX         2.69E-06                                                          6.26E-06
                                EBACCCGGDDBCBABBFABABB           0.1191      9  2.94E+00  9.42E-07
                                EBACCCGGDDBCBABBFBBABB           0.5880      9  2.94E+00  4.65E-06
                                EBACCCGGDDBCBABBFEBBBB           0.0778      9  2.94E+00  6.16E-07

      TBU          8.07E-08                                                          1.39E-07
                                EBAACCGGDDBCBABBEGBBBB           0.5846      9  2.94E+00  1.39E-07
 0    EARLY FATALITIES

      FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
      TB                 0.22
      TBUX               0.76
      TBU                0.02
 0    EARLY FATALITIES

      FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
      EBAACCGGDDBCBABBEGBBBB        0.02
      EBACCCGGDDBCBABBFABABB        0.11
      EBACCCGGDDBCBABBFBBABB        0.57
      EBACCCGGDDBCBABBFEBBBB        0.07
      FCACCCGGDDBCBABBEABABB        0.04
      FCACCCGGDDBCBABBEBBABB        0.18
 0    EARLY FATALITIES

      FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
      PCH  9D            0.99
 1    CONSEQUENCE MEASURE:  EARLY FATALITIES

      DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


      SELECTION NO.  15     145-TH FROM BOTTOM     SAMPLE MEMBER  36  RISK= 8.260E-06
      ISSUE LEVELS:   3 3 3 1 3   3 2 2 2 1   6 2 2 2 1   1 5 1 1 2   1 2 2 1 2   4 4 3 3 3   2 4 1 3 4
 3 1

      SEQ.          FREQ.       CFM                              PROB.      REL  CONS.  CONTRIB.
```

```
     TB          1.57E-06          .                                              1.76E-06
                               FCACCCGGDDBCBABBGCBABB     0.3808     9  2.94E+00  1.76E-06

     TBUX        2.69E-06                                                         6.27E-06
                               EBACCCGGDDBCBABBFABABB     0.1193     9  2.94E+00  9.44E-07
                               EBACCCGGDDBCBABBFCBABB     0.5889     9  2.94E+00  4.66E-06
                               EBACCCGGDDBCBABBFEBBBB     0.0780     9  2.94E+00  6.17E-07

     TBU         8.07E-08                                                         1.41E-07
                               EBAACCGGDDBCBABBEHBBBB     0.5922     9  2.94E+00  1.41E-07
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TB              0.21
     TBUX            0.76
     TBU             0.02
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     EBAACCGGDDBCBABBEHBBBB       0.02
     EBACCCGGDDBCBABBFABABB       0.11
     EBACCCGGDDBCBABBFCBABB       0.56
     EBACCCGGDDBCBABBFEBBBB       0.07
     FCACCCGGDDBCBABBGCBABB       0.21
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  9D         0.98
1    CONSEQUENCE MEASURE:  EARLY FATALITIES

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.  16     146-TH FROM BOTTOM     SAMPLE MEMBER  22  RISK= 8.442E-06
     ISSUE LEVELS:   3 4 4 1 2    3 3 2 2 1    3 2 2 2 2    3 1 2 1 2    2 2 2 2 2    4 4 3 1 2    3 3 2 1 1
5 5

     SEQ.          FREQ.       CFM                            PROB.      REL  CONS.  CONTRIB.

     TBUX        3.50E-05                                                         8.37E-06
                               EBACCCGGDDBCBABBFFABBB     0.6179     6  3.86E-01  8.35E-06
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TBUX            0.99
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     EBACCCGGDDBCBABBFFABBB       0.99
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  6D         1.00
1    CONSEQUENCE MEASURE:  EARLY FATALITIES

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.  17     147-TH FROM BOTTOM     SAMPLE MEMBER  90  RISK= 8.587E-06
     ISSUE LEVELS:   3 4 3 1 2    2 2 2 3 1    6 3 2 2 2    3 5 1 1 2    1 2 2 2 4    2 5 3 2 2    3 4 2 2 2
2 7

     SEQ.          FREQ.       CFM                            PROB.      REL  CONS.  CONTRIB.

     TBUX        3.50E-05                                                         8.50E-06
                               EBACCCGGDDBCBABBFEABBB     0.6247     6  3.86E-01  8.45E-06
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TBUX            0.99
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     EBACCCGGDDBCBABBFEABBB       0.98
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  6D         0.99
1    CONSEQUENCE MEASURE:  EARLY FATALITIES

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.  18     148-TH FROM BOTTOM     SAMPLE MEMBER 149  RISK= 8.937E-06
```

238

```
     ISSUE LEVELS:   2 4 3 1 3    4 1 2 3 1    6 2 2 2 1    3 2 3 1 2    1 2 1 2 2    2 5 3 3 2    3 4 1 3 2
1 7

     SEQ.          FREQ.      CFM                         PROB.      REL  CONS.   CONTRIB.

     TB          1.57E-06                                                         1.82E-07
                              FCACCCGGDDBCBABBDBBABB      0.4064      8  2.85E-01  1.82E-07

     TBUX        3.72E-05                                                         8.75E-06
                              EBACBCGGDCBCBABBFBBABA      0.0264      6  3.86E-01  3.79E-07
                              EBACCCGGDDBCBABBFABABB      0.1196      8  2.85E-01  1.27E-06
                              EBACCCGGDDBCBABBFBBABB      0.5907      8  2.85E-01  6.26E-06
                              EBACCCGGDDBCBABBFEBBBB      0.0782      8  2.85E-01  6.29E-07
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TB              0.02
     TBUX            0.98
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     EBACBCGGDCBCBABBFBBABA       0.04
     EBACCCGGDDBCBABBFABABB       0.14
     EBACCCGGDDBCBABBFBBABB       0.70
     EBACCCGGDDBCBABBFEBBBB       0.09
     FCACCCGGDDBCBABBDBBABB       0.02
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  6D         0.04
     PCH  8D         0.96
1    CONSEQUENCE MEASURE:  EARLY FATALITIES

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.  19     149-TH FROM BOTTOM     SAMPLE MEMBER 120  RISK= 1.138E-05
     ISSUE LEVELS:   3 4 3 1 4    3 3 1 3 2    6 2 2 1 1    2 4 1 2 2    1 1 2 2 2    3 4 3 2 4    4 4 2 1 3
2 1

     SEQ.          FREQ.      CFM                         PROB.      REL  CONS.   CONTRIB.

     TB          3.32E-06                                                         [illegible].50E-07
                              FCACCCGGDDBCBADBECBABB      0.3708      8  2.85E-01  3.50E-07

     TBUX        3.72E-05                                                         1.10E-05
                              EBACCCFGFDBBBADBFCBABB      0.0227      6  3.86E-01  3.26E-07
                              EBACCCFGFDBCBACBFCBABB      0.0239      6  3.86E-01  3.44E-07
                              EBACCCFGFDBCBADBFCBABB      0.3453      6  3.86E-01  4.96E-06
                              EBACCCGEFDBCCADBFCBABB      0.1820      6  3.86E-01  2.61E-06
                              EBACCCGEFDBCCADBFEBBBB      0.0247      6  3.86E-01  3.54E-07
                              EBACCCGGDDBCBADBFABABB      0.1411      8  2.85E-01  1.50E-06
                              EBACCCGGDDBCBADBFCBABB      0.0159      8  2.85E-01  1.69E-07
                              EBACCCGGEDBCBADBFCBABB      0.1298      7  7.98E-02  3.85E-07
                              EBACCCGGEDBCBADBFEBBBB      0.0176      6  3.86E-01  2.52E-07
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TB              0.03
     TBUX            0.97
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     EBACCCFGFDBBBADBFCBABB       0.03
     EBACCCFGFDBCBACBFCBABB       0.03
     EBACCCFGFDBCBADBFCBABB       0.44
     EBACCCGEFDBCCADBFCBABB       0.23
     EBACCCGEFDBCCADBFEBBBB       0.03
     EBACCCGGDDBCBADBFABABB       0.13
     EBACCCGGDDBCBADBFCBABB       0.01
     EBACCCGGEDBCBADBFCBABB       0.03
     EBACCCGGEDBCBADBFEBBBB       0.02
     FCACCCGGDDBCBADBECBABB       0.03
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  6D         0.78
     PCH  7D         0.03
     PCH  8D         0.19
1    CONSEQUENCE MEASURE:  EARLY FATALITIES

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.  20     150-TH FROM BOTTOM     SAMPLE MEMBER  20  RISK= 6.452E-05
     ISSUE LEVELS:   2 4 2 1 2    3 4 4 3 1    5 3 2 1 1    3 1 2 1 1    1 1 1 2 3    4 4 2 4 3    3 3 1 1 2
1 8

     SEQ.          FREQ.      CFM                            PROD.      REL  CONS.  CONTRIB.

     TBUX        3.50E-05                                                           6.39E-05
                              EBACCCGGDDBCBADBFABABB     0.0936      9  2.94E+00  9.64E-06
                              EBACCCGGDDBCBADBFBBABB     0.4624      9  2.94E+00  4.76E-05
                              EBACCCGGDDBCBADBFFBBBB     0.0612      9  2.94E+00  6.30E-06
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TBUX            0.99
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     EBACCCGGDDBCBADBFABABB       0.15
     EBACCCGGDDBCBADBFBBABB       0.74
     EBACCCGGDDBCBADBFFBBBB       0.10
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  9D         0.99
1    CONSEQUENCE MEASURE:  EARLY CONSEQUTNCE MEASURE:  LATENT CANCERS

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.  1       1-TH FROM BOTTOM     SAMPLE MEMBER   4  RISK= 1.094E-04
     ISSUE LEVELS:   2 2 2 1 1    2 3 3 4 1    6 3 2 2 2    1 2 1 2 2    2 2 2 2 2    2 4 3 3 2    2 2 1 2 4
5 7

     SEQ.          FREQ.      CFM                            PROD.      REL  CONS.  CONTRIB.

     TB          2.73E-07                                                           7.84E-05
                              FCACCCFGFDBCBABBGFABBB     0.0415      3  5.24E+02  5.93E-06
                              FCACCCGGEDBCBABBGFABBB     0.1238      4  5.08E+02  1.71E-05
                              FCBBAAGCFBBCCBBBHHABBB     0.0723      3  5.24E+02  1.03E-05
                              FCBBACGCFBBCCBBBHHABBB     0.0728      3  5.24E+02  1.04E-05
                              FCBBACGEFBBCCABBEGABBB     0.1015      2  4.11E+01  1.14E-06
                              FCCBAAGCFBBBCBBBHHABBB     0.0854      3  5.24E+02  1.22E-05
                              FCCBAAGCFBBCCBBBHHABBB     0.1443      3  5.24E+02  2.06E-05

     TCSX        6.93E-08                                                           6.67E-06
                              BAACAAGBFABCCBBBHHABBB     0.3365     20  1.34E+02  3.12E-06
                              BAACACGGDAACBABBDDABBB     0.0320     31  1.60E+03  3.54E-06

     TCSRV23     2.02E-08                                                           2.43E-05
                              DABAACGADDACBBBBHGABAB     0.1843     41  5.24E+03  1.95E-05
                              DACAAAGADABCCBBBHHABBB     0.3793     29  6.24E+02  4.78E-06
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TB              0.72
     TCSX            0.06
     TCSRV23         0.22
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     BAACAAGBFABCCBBBHHABBB       0.03
     BAACACGGDAACBABBDDABBB       0.03
     DABAACGADDACBBBBHGABAB       0.18
     DACAAAGADABCCBBBHHABBB       0.04
     FCACCCFGFDBCBABBGFABBB       0.05
     FCACCCGGEDBCBABBGFABBB       0.16
     FCBBAAGCFBBCCBBBHHABBB       0.09
     FCBBACGCFBBCCBBBHHABBB       0.10
     FCBBACGEFBBCCABBEGABBB       0.01
     FCCBAAGCFBBBCBBBHHABBB       0.11
     FCCBAAGCFBBCCBBBHHABBB       0.19
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  2D         0.02
     PCH  3D         0.54
     PCH  4D         0.16
     PCH 20D         0.03
     PCH 29D         0.04
     PCH 31D         0.03
     PCH 41D         0.18
1    CONSEQUENCE MEASURE:  LATENT CANCERS

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.  2       2-TH FROM BOTTOM     SAMPLE MEMBER  17  RISK= 2.238E-04
```

```
    ISSUE LEVELS:   2 2 3 1 1    3 2 3 2 1    6 2 2 2 1    3 5 2 1 1    1 2 2 3 5    4 3 3 1 2    4 2 2 3 1
5 2

    SEQ.          FREQ.      CFM                         PROB.      REL  CONS.  CONTRIB.

    TB          2.73E-07                                                        1.24E-04
                             FCACCCGGDDBCBABBDABABB      0.0245      5  1.24E+03  8.30E-06
                             FCACCCGGDDBCBABBDBBABB      0.1212      5  1.24E+03  4.10E-05
                             FCBBAAGCDBBCBBBBHHABBB      0.1088      4  5.08E+02  1.51E-05
                             FCBBACGCDBBCBBBBHHABBB      0.1096      4  5.08E+02  1.52E-05
                             FCBBACGGDBBCBABBEGABBB      0.1027      3  5.24E+02  1.47E-05
                             FCCBAAGCFBBCCBBBHHABBB      0.2175      4  5.08E+02  3.01E-05

    TBUX        3.16E-08                                                        1.86E-05
                             EBACCCGGDDBCBABBFBBABB      0.4737      5  1.24E+03  1.86E-05

    TBU         6.37E-08                                                        2.83E-05
                             EBAACCGGDDBCBABBEHBBBB      0.3578      5  1.24E+03  2.83E-05

    TCSX        6.93E-08                                                        1.12E-05
                             BAACAAGBDAACBBBBHHABBB      0.3323     20  1.34E+02  3.09E-06
                             BAACACGBDAACBBBBHHABBB      0.3323     24  3.54E+02  8.15E-06

    TCUX        3.65E-07                                                        2.46E-05
                             AAACAAGGDABCBABBECABBB      0.2420     12  3.35E+01  2.96E-06
                             AAACACGGDABCBABBECABBB      0.2420     20  1.34E+02  1.18E-05
                             AABBAAGGDABCBABBDGABBB      0.0356     12  3.35E+01  4.30E-07
                             AABBAAGGDABCBABBFGABBB      0.0356     12  3.35E+01  4.35E-07
                             AABBACGGDABCBABBDGABBB      0.0832     20  1.34E+02  4.07E-06
                             AABBACGGDABCBABBDGBBBB      0.0235     20  1.34E+02  1.15E-06
                             AABBACGGDABCBABBFGABBB      0.0831     19  9.66E+01  2.93E-06
                             AABBACGGDABCBABBFGBBBB      0.0235     19  9.66E+01  8.28E-07

    TCSRV23     2.22E-08                                                        1.68E-05
                             DABAAAGADDACBBBBHGABAB      0.4137     29  6.24E+02  5.72E-06
                             DABAACGADDACBBBBHGABAB      0.4137     37  1.21E+03  1.11E-05
0   LATENT CANCERS

    FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
    TB                 0.56
    TBUX               0.08
    TBU                0.13
    TCSX               0.05
    TCUX               0.11
    TCSRV23            0.08
0   LATENT CANCERS

    FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
    AAACAAGGDABCBABBECABBB      0.01
    AAACACGGDABCBABBECABBB      0.05
    AABBACGGDABCBABBDGABBB      0.02
    AABBACGGDABCBABBFGABBB      0.01
    BAACAAGBDAACBBBBHHABBB      0.01
    BAACACGBDAACBBBBHHABBB      0.04
    DABAAAGADDACBBBBHGABAB      0.03
    DABAACGADDACBBBBHGABAB      0.05
    EBAACCGGDDBCBABBEHBBBB      0.13
    EBACCCGGDDBCBABBFBBABB      0.08
    FCACCCGGDDBCBABBDABABB      0.04
    FCACCCGGDDBCBABBDBBABB      0.18
    FCBBAAGCDBBCBBBBHHABBB      0.07
    FCBBACGCDBBCBBBBHHABBB      0.07
    FCBBACGGDBBCBABBEGABBB      0.07
    FCCBAAGCFBBCCBBBHHABBB      0.13
0   LATENT CANCERS

    FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
    PCH  3D            0.07
    PCH  4D            0.27
    PCH  5D            0.43
    PCH 12D            0.02
    PCH 19D            0.02
    PCH 20D            0.09
    PCH 24D            0.04
    PCH 29D            0.03
    PCH 37D            0.05
1   CONSEQUENCE MEASURE:  LATENT CANCERS

    DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


    SELECTION NO.   3       3-TH FROM BOTTOM     SAMPLE MEMBER 104  RISK= 3.122E-04
    ISSUE LEVELS:   2 1 2 2 1    4 1 3 3 1    3 3 1 2 2    2 2 2 2 1    2 2 1 2 2    3 4 3 2 1    4 3 2 3 1
3 2

    SEQ.          FREQ.      CFM                         PROB.      REL  CONS.  CONTRIB.
```

```
        TB          2.73E-07                                                  8.26E-05
                                  FCACCCGGEDBCBABBEEABBB      0.1186     3  5.24E+02  1.69E-05
                                  FCBBAAGCFBBCCBBBHHABBB      0.1117     3  5.24E+02  1.60E-05
                                  FCBBACGCFBBCCBBBHHABBB      0.1126     3  5.24E+02  1.61E-05
                                  FCBBACGEFBBCCABBEGABBB      0.1571     2  4.11E+01  1.76E-06
                                  FCCBAAGCFBBCCBBBHHABBB      0.2233     3  5.24E+02  3.19E-05

        TCSX        6.93E-08                                                  3.27E-05
                                  BAACAAGBFAACCBBBHHABBB      0.4570    19  9.66E+01  3.06E-06
                                  BAACACGBFAACCBBBHHABBB      0.4570    21  9.37E+02  2.97E-05

        TCUX        3.65E-07                                                  1.63E-05
                                  AAACAADEEABCCABBEEABBB      0.1470     2  4.11E+01  2.20E-06
                                  AAACAAGEFABCCABBEEABBB      0.0905     2  4.11E+01  1.36E-06
                                  AAACACDEEABCCABBEBBABB      0.0197    13  1.35E+02  9.72E-07
                                  AAACACDEEABCCABBEEABBB      0.1470    13  1.35E+02  7.24E-06
                                  AAACACGEFABCCABBEEABBB      0.0905     2  4.11E+01  1.36E-06
                                  AABBACGEFABCCABBDGABBB      0.0816     2  4.11E+01  1.22E-06
                                  AABBACGEFABCCABBDGBBBB      0.0231     2  4.11E+01  3.46E-07
                                  AABBACGEFABCCABBFGABBB      0.0815     2  4.11E+01  1.22E-06
                                  AABBACGEFABCCABBFGBBBB      0.0230     2  4.11E+01  3.45E-07

        TCSRX2      2.02E-07                                                  1.81E-04
                                  CAACAABGFDACBCCBADABAB      0.1251    15  1.38E+03  3.49E-05
                                  CAACAABGFDACBCCBAEABAB      0.1251    15  1.38E+03  3.49E-05
                                  CAACACBGFDACBCCBADABAB      0.0682    28  1.70E+03  2.34E-05
                                  CAACACBGFDACBCCBAEABAB      0.0682    28  1.70E+03  2.34E-05
                                  CAACACBGFDACBCDBAEABAB      0.0569    28  1.70E+03  1.96E-05
                                  DAAAAAGBFDACCBBBHHABBB      0.3240    22  3.23E+02  2.11E-05
                                  DAAAACGBFDACCBBBHHABBB      0.3240    24  3.54E+02  2.32E-05
   0    LATENT CANCERS

        FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
        TB                 0.26
        TCSX               0.10
        TCUX               0.05
        TCSRX2             0.58
   0    LATENT CANCERS

        FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
        AAACACDEEABCCABBEEABBB       0.02
        BAACACGBFAACCBBBHHABBB       0.10
        CAACAABGFDACBCCBADABAB       0.11
        CAACAABGFDACBCCBAEABAB       0.11
        CAACACBGFDACBCCBADABAB       0.08
        CAACACBGFDACBCCBAEABAB       0.08
        CAACACBGFDACBCDBAEABAB       0.06
        DAAAAAGBFDACCBBBHHABBB       0.07
        DAAAACGBFDACCBBBHHABBB       0.07
        FCACCCGGEDBCBABBEEABBB       0.05
        FCBBAAGCFBBCCBBBHHABBB       0.05
        FCBBACGCFBBCCBBBHHABBB       0.05
        FCCBAAGCFBBCCBBBHHABBB       0.10
   0    LATENT CANCERS

        FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
        PCH  2D            0.03
        PCH  3D            0.26
        PCH 13D            0.03
        PCH 15D            0.22
        PCH 21D            0.10
        PCH 22D            0.07
        PCH 24D            0.07
        PCH 28D            0.21
   1    CONSEQUENCE MEASURE:  LATENT CANCERS

        DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


        SELECTION NO.   4       4-TH FROM BOTTOM     SAMPLE MEMBER 107  RISK= 3.195E-04
        ISSUE LEVELS:   2 2 2 2 2    2 3 3 3 1    8 2 2 1 1    2 2 1 2 2    1 2 1 2 1    2 3 2 1 1    4 3 2 2 2
   2 6

        SEQ.          FREQ.       CFM                         PROB.      REL  CONS.   CONTRIB.

        TB          7.39E-07                                                  2.66E-04
                                  FCACCCFGFDBCBADBECBABB      0.0740     4  5.08E+02  2.78E-05
                                  FCACCCGGDDBCBACBEABABB      0.0034     8  8.23E+03  2.04E-05
                                  FCACCCGGDDBCBADBEABABB      0.0302     8  8.23E+03  1.84E-0x?'"
   FCACCCGGEDBCBABBECBABB    0.0415    3  51.60E-05
                                  FCCBAAGCFBBCCBBBHHABBB      0.1067     2  4.11E+01  3.24E-06

        TBUX        3.58E-08                                                  3.30E-05
                                  EBACCCFGFDBCBADBFCBABB      0.2384     4  5.08E+02  4.33E-06
                                  EBACCCGGDDBCBADBFABABB      0.0973     8  8.23E+03  2.86E-05
```

```
    TCSRX2      2.02E-07                                                       2.08E-05
                               DAAAAAGBFABCCBBBHHABBB    0.4286    19  9.66E+01  8.37E-06
                               DAAAACGBFABCCBBBHHABBB    0.4286    18  1.44E+02  1.25E-05
0   LATENT CANCERS

    FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
    TB              0.83
    TBUX            0.10
    TCSRX2          0.07
0   LATENT CANCERS

    FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
    DAAAAAGBFABCCBBBHHABBB      0.03
    DAAAACGBFABCCBBBHHABBB      0.04
    EBACCCFGFDBCBADBFCBABB      0.01
    EBACCCGGDDBCBADBFABABB      0.09
    FCACCCFGFDBCBADBECBABB      0.09
    FCACCCGGDDBCBACBEABABB      0.06
    FCACCCGGDDBCBADBEABABB      0.58
    FCACCCGGEDBCBABBECBABB      0.05
    FCCBAAGCFBBCCBBBHHABBB      0.01
0   LATENT CANCERS

    FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
    PCH  2D         0.06
    PCH  3D         0.05
    PCH  4D         0.10
    PCH  8D         0.73
    PCH 18D         0.04
    PCH 19D         0.03
1   CONSEQUENCE MEASURE:  LATENT CANCERS

    DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


    SELECTION NO.   5       5-TH FROM BOTTOM      SAMPLE MEMBER 133  RISK= 3.519E-04
    ISSUE LEVELS:   3 2 2 1 3    3 3 2 3 1    5 3 2 2 2    1 2 3 2 2    2 2 2 1 4    2 4 3 2 2    4 1 2 2 2
3 4

    SEQ.        FREQ.      CFM                         PROB.      REL  CONS.   CONTRIB.

    TB          1.57E-06                                                       2.20E-04
                           FCACCCFGFDBCBABBGEABBB      0.0858      2  4.11E+01  5.55E-06
                           FCACCCGEFDBCCABBGEABBB      0.0423      2  4.11E+01  2.73E-06
                           FCACCCGGEDBCBABBGEABBB      0.2528      3  5.24E+02  2.08E-04

    TCSRX2      6.75E-07                                                       1.32E-04
                           CAACAABGFDACBCCBADABAB      0.0602     12  3.35E+01  1.36E-06
                           CAACAABGFDACBCCBAEABAB      0.0602     12  3.35E+01  1.36E-06
                           CAACACBGFDACBCCBADABAB      0.0328     21  9.37E+02  2.07E-05
                           CAACACBGFDACBCCBAEABAB      0.0328     21  9.37E+02  2.07E-05
                           DAAAAAGBFABCCBBBHHABBB      0.3383     12  3.35E+01  7.65E-06
                           DAAAAAGBFDACCBBBHHABBB      0.1557     12  3.35E+01  3.52E-06
                           DAAAAAGGDDACBBBBAEABAB      0.0193     15  1.30E+03  1.80E-05
                           DAAAACGBFABCCBBBHHABBB      0.3383     19  9.66E+01  2.21E-05
                           DAAAACGBFDACCBBBHHABBB      0.1557     20  1.34E+02  1.41E-05
                           DAAAACGGDDACBBBBAEABAB      0.0193     28  1.70E+03  2.22E-05
0   LATENT CANCERS

    FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
    TB              0.63
    TCSRX2          0.37
0   LATENT CANCERS

    FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
    CAACACBGFDACBCCBADABAB      0.06
    CAACACBGFDACBCCBAEABAB      0.06
    DAAAAAGBFABCCBBBHHABBB      0.02
    DAAAAAGBFDACCBBBHHABBB      0.01
    DAAAAAGGDDACBBBBAEABAB      0.05
    DAAAACGBFABCCBBBHHABBB      0.06
    DAAAACGBFDACCBBBHHABBB      0.04
    DAAAACGGDDACBBBBAEABAB      0.06
    FCACCCFGFDBCBABBGEABBB      0.02
    FCACCCGGEDBCBABBGEABBB      0.59
0   LATENT CANCERS

    FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
    PCH  1D         0.01
    PCH  2D         0.02
    PCH  3D         0.59
    PCH 12D         0.04
    PCH 15D         0.05
    PCH 19D         0.06
    PCH 20D         0.04
    PCH 21D         0.12
    PCH 28D         0.06
1   CONSEQUENCE MEASURE:  LATENT CANCERS

    DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


    SELECTION NO.   6       6-TH FROM BOTTOM     SAMPLE MEMBER  69  RISK= 4.683E-04
    ISSUE LEVELS:   3 2 3 2 1   2 3 2 2 1   7 2 2 2 1   3 1 2 2 1   1 1 3 3 2   2 1 2 2 2   4 3 2 2 4
1 1

    SEQ.          FREQ.     CFM                         PROB.     REL  CONS.   CONTRIB.

    TB          2.73E-07                                                      1.91E-04
                            FCACCCGDFDBCBADBDBBABB      0.0370     7  7.28E+03  7.34E-05
                            FCACCCGDFDBCCADBDBBABB      0.0555     4  5.08E+02  7.69E-06
                            FCACCCGGDDBCBADBDABABB      0.0203     7  7.28E+03  4.03E-05
                            FCBBAAGCFBBCCDDBHHABBB      0.0682     3  5.24E+02  9.75E-06
                            FCBBACGCFBBBCDDBHHABBB      0.0407     4  5.08E+02  5.63E-06
                            FCBBACGCFBBCCDDBHHABBB      0.0688     3  5.24E+02  9.82E-06
                            FCBBACGEFBBCCADBEGABBB      0.0949     3  5.24E+02  1.36E-05
                            FCCBAAGCFBBBCDDBHHABBB      0.0806     4  5.08E+02  1.12E-05
                            FCCBAAGCFBBCCDDBHHABBB      0.1363     3  5.24E+02  1.95E-05

    TBUX        3.16E-08                                                      2.18E-05
                            EBACCCFGFDBCBADBFBBABB      0.2446     4  5.08E+02  3.93E-06
                            EBACCCGGDDBCBADBFABABB      0.0775     7  7.28E+03  1.79E-05

    TCSX        2.31E-07                                                      7.00E-05
                            BAACAAGBFAACCDDBHHABBB      0.0855    24  3.54E+02  7.01E-06
                            BAACAAGBFABCCDDBHHABBB      0.1858    24  3.54E+02  1.52E-05
                            BAACACGBFAACCDDBHHABBB      0.0855    24  3.54E+02  7.01E-06
                            BAACACGBFABCCDDBHHABBB      0.1858    24  3.54E+02  1.52E-05
                            BABBACGEFABCCADBEGABBB      0.1259     3  5.24E+02  1.53E-05
                            BACBAAGCFAACCDDBHHABBB      0.0468    22  3.23E+02  3.50E-06
                            BACBAAGCFABCCDDBHHABBB      0.0915    22  3.23E+02  6.84E-06

    TCUX        3.54E-07                                                      1.33E-04
                            AAACAAGDFABCCABBEBBABB      0.0120    24  3.54E+02  1.50E-06
                            AAACAAGEFABCCABBEEABBB      0.2396     3  5.24E+02  4.44E-05
                            AAACACGDFABCCABBEBBABB      0.0120    24  3.54E+02  1.50E-06
                            AAACACGEFABCCABBEEABBB      0.2396     3  5.24E+02  4.44E-05
                            AABBACGEFABCCABBDGABBB      0.0824     3  5.24E+02  1.53E-05
                            AABBACGEFABCCABBDGBBBB      0.0233     3  5.24E+02  4.31E-06
                            AABBACGEFABCCABBFGABBB      0.0823     3  5.24E+02  1.52E-05
                            AABBACGEFABCCABBFGBBBB      0.0233     3  5.24E+02  4.31E-06

    TCSRV23     7.40E-08                                                      5.21E-05
                            DABAAAGADABCBDDBHGABAB      0.4243    29  6.24E+02  1.96E-05
                            DABAACGADDACBDDBHGABAB      0.2062    33  1.40E+03  2.14E-05
                            DACAAAGADABCCDDBHHABBB      0.4243    24  3.54E+02  1.11E-05
0   LATENT CANCERS

    FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
    TB              0.41
    TBUX            0.05
    TCSX            0.15
    TCUX            0.28
    TCSRV23         0.11
0   LATENT CANCERS

    FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
    AAACAAGEFABCCABBEEABBB        0.09
    AAACACGEFABCCABBEEABBB        0.09
    AABBACGEFABCCABBDGABBB        0.03
    AABBACGEFABCCABBFGABBB        0.03
    BAACAAGBFAACCDDBHHABBB        0.01
    BAACAAGBFABCCDDBHHABBB        0.03
    BAACACGBFAACCDDBHHABBB        0.01
    BAACACGBFABCCDDBHHABBB        0.03
    BABBACGEFABCCADBEGABBB        0.03
    BACBAAGCFABCCDDBHHABBB        0.01
    DABAAAGADABCBDDBHGABAB        0.04
    DABAACGADDACBDDBHGABAB        0.05
    DACAAAGADABCCDDBHHABBB        0.02
    EBACCCGGDDBCBADBFABABB        0.04
    FCACCCGDFDBCBADBDBBABB        0.16
    FCACCCGDFDBCCADBDBBABB        0.02
    FCACCCGGDDBCBADBDABABB        0.09
    FCBBAAGCFBBCCDDBHHABBB        0.02
    FCBBACGCFBBBCDDBHHABBB        0.01
    FCBBACGCFBBCCDDBHHABBB        0.02
    FCBBACGEFBBCCADBEGABBB        0.03
    FCCBAAGCFBBBCDDBHHABBB        0.02
    FCCBAAGCFBBCCDDBHHABBB        0.04
0   LATENT CANCERS
```

```
     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  3D          0.42
     PCH  4D          0.06
     PCH  7D          0.28
     PCH 22D          0.02
     PCH 24D          0.13
     PCH 29D          0.04
     PCH 33D          0.05
1    CONSEQUENCE MEASURE:  LATENT CANCERS

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.   7       7-TH FROM BOTTOM     SAMPLE MEMBER 125  RISK= 5.063E-04
     ISSUE LEVELS:   3 2 3 2 3   2 4 3 1 1   8 3 1 2 2   3 4 2 2 2   1 2 2 2 4   2 2 2 2 2   1 2 1 2 2
1 1

     SEQ.          FREQ.      CFM                          PROB.      REL  CONS.  CONTRIB.

     TB          1.57E-06                                                          3.56E-04
                              FCACCCFGFDBCBABBDEABBB       0.0940      2  4.11E+01  6.07E-06
                              FCACCCGBFDBCCDDBHHABBB       0.0129      4  5.08E+02  1.03E-05
                              FCACCCGGEDDCBABBDEABBB       0.2820      3  5.24E+02  2.32E-04
                              FCBBAAGCFBBBCBBBHHABBB       0.0256      3  5.24E+02  2.11E-05
                              FCBBACGCFBBBCBBBHHABBB       0.0258      3  5.24E+02  2.13E-05
                              FCBBACGEFBBCCABBEGABBB       0.0610      2  4.11E+01  3.94E-06
                              FCCBAAGCFBBBCBBBHHABBB       0.0512      3  5.24E+02  4.22E-05
                              FCCBAAGCFBBCCBBBHHABBB       0.0866      2  4.11E+01  5.60E-06

     TCSRX2      7.40E-07                                                          1.50E-04
                              DAAAAAGBFABCCBBBHHABBB       0.4433     20  1.34E+02  4.40E-05
                              DAAAACGBFABCCBBBHHABBB       0.4433     22  3.23E+02  1.06E-04
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TB               0.70
     TCSRX2           0.30
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     DAAAAAGBFABCCBBBHHABBB       0.09
     DAAAACGBFABCCBBBHHABBB       0.21
     FCACCCFGFDBCBABBDEABBB       0.01
     FCACCCGBFDBCCDDBHHABBB       0.02
     FCACCCGGEDBCBABBDEABBB       0.46
     FCBBAAGCFBBBCBBBHHABBB       0.04
     FCBBACGCFBBBCBBBHHABBB       0.04
     FCCBAAGCFBBBCBBBHHABBB       0.08
     FCCBAAGCFBBCCBBBJHABBB       0.01
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  2D          0.06
     PCH  3D          0.63
     PCH  4D          0.02
     PCH 20D          0.09
     PCH 22D          0.21
1    CONSEQUENCE MEASURE:  LATENT CANCERS

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.   8       8-TH FROM BOTTOM     SAMPLE MEMBER  91  RISK= 6.490E-04
     ISSUE LEVELS:   2 2 2 1 2   2 2 3 3 1   9 2 2 2 1   2 4 2 2 2   2 2 1 2 4   5 4 2 2 2   4 3 2 2 1
3 1

     SEQ.          FREQ.      CFM                          PROB.      REL  CONS.  CONTRIB.

     TB          7.39E-07                                                          5.59E-04
                              FCACBBGEFCBCCABBEBBABA       0.0196      4  5.08E+02  7.38E-06
                              FCACBCGEFCBCCABBEBBABA       0.0196      3  5.24E+02  7.60E-06
                              FCACCCFGFDBCBABBEBBABB       0.0410      3  5.24E+02  1.59E-05
                              FCACCCFGFDBCBADBEBBABB       0.0733      3  5.24E+02  2.84E-05
                              FCACCCGGDDBCBABBEABABB       0.0347      7  7.28E+03  1.87E-04
                              FCACCCGGDDBCBABBEBBABB       0.0024      7  7.28E+03  1.28E-05
                              FCACCCGGEDBCBABBEBBABB       0.0410      4  5.08E+02  1.54E-05
                              FCBBAAGCFBBBCBBBHHABBB       0.0317      5  1.24E+03  2.90E-05
                              FCBBAAGCFBBCCBBBHHABBB       0.0536      4  5.08E+02  2.01E-05
                              FCBBACGCFBBBCBBBHHABBB       0.0320      5  1.24E+03  2.93E-05
                              FCBBACGCFBBBCBBBHHBBBB       0.0125      5  1.24E+03  1.15E-05
                              FCBBACGCFBBCCBBBHHABBB       0.0540      4  5.08E+02  2.03E-05
                              FCBBACGCFBBCCBBBHHBBBB       0.0212      4  5.08E+02  7.95E-06
                              FCCBAAGCFBBBCBBBHHABBB       0.0634      5  1.24E+03  5.81E-05
                              FCCBAAGCFBBCCBBBHHABBB       0.1072      5  1.24E+03  9.82E-05
     TCSX        6.93E-08                                                    4.29E-05
                               BAACACGBFAACCBBBHHABBB    0.6015   23  1.03E+03  4.29E-05

     TCSRV23     2.02E-08                                                    4.74E-05
                               DABAACGADDACBBBBHGABAB    0.3974   41  5.24E+03  4.21E-05
                               DACAAAGADDACCBBBHHABBB    0.4183   29  6.24E+02  5.27E-06
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TB              0.86
     TCSX            0.07
     TCSRV23         0.07
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     BAACACGBFAACCBBBHHABBB        0.07
     DABAACGADDACBBBBHGABAB        0.06
     FCACBBGEFCBCCABBEBBABA        0.01
     FCACBCGEFCBCCABBEBBABA        0.01
     FCACCCFGFDBCBABBEBBABB        0.02
     FCACCCFGFDBCBADBEBBABB        0.04
     FCACCCGGDDBCBABBEABABB        0.29
     FCACCCGGDDBCBABBEBBABB        0.02
     FCACCCGGEDBCBABBEBBABB        0.02
     FCBBAAGCFBBBCBBBHHABBB        0.04
     FCBBAAGCFBBCCBBBHHABBB        0.03
     FCBBACGCFBBBCBBBHHABBB        0.05
     FCBBACGCFBBBCBBBHHBBBB        0.02
     FCBBACGCFBBCCBBBHHABBB        0.03
     FCBBACGCFBBCCBBBHHBBBB        0.01
     FCCBAAGCFBBBCBBBHHABBB        0.09
     FCCBAAGCFBBCCBBBHHABBB        0.15
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  3D         0.08
     PCH  4D         0.11
     PCH  5D         0.35
     PCH  7D         0.32
     PCH 23D         0.07
     PCH 41D         0.06
1    CONSEQUENCE MEASURE:  LATENT CANCERS

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.   9       9-TH FROM BOTTOM     SAMPLE MEMBER 105  RISK= 7.004E-04
     ISSUE LEVELS:   2 2 2 2 2   2 2 2 3 1   6 2 2 1 1   1 1 1 2 2   1 2 2 1 2   4 2 3 3 2   1 3 1 2 4
3 6

     SEQ.          FREQ.       CFM                       PROB.     REL  CONS.   CONTRIB.

     TB          7.39E-07                                                    5.40E-04
                               FCACBBGEFCBCCABBGCBABA    0.0196    4  5.08E+02  7.36E-06
                               FCACCCFGFDBCBABBGCBABB    0.0380    4  5.08E+02  1.43E-05
                               FCACCCFGFDBCBADBGCBABB    0.0666    5  1.24E+03  6.10E-05
                               FCACCCGEFDBCCABBGCBABB    0.0188    6  3.31E+03  4.59E-05
                               FCACCCGGDDBCBABBGABAAB    0.0010    8  8.23E+03  6.21E-06
                               FCACCCGGDDBCBABBGABABB    0.0342    8  8.23E+03  2.08E-04
                               FCACCCGGEDBCBABBGCBABB    0.0380    5  1.24E+03  3.49E-05
                               FCBBAAGCFBBBCBBBHHABBB    0.0312    4  5.08E+02  1.17E-05
                               FCBBAAGCFBBCCBBBHHABBB    0.0528    3  5.24E+02  2.04E-05
                               FCBBACGCFBBBCBBBHHABBB    0.0315    5  1.24E+03  2.88E-05
                               FCBBACGCFBBCCBBBHHABBB    0.0532    3  5.24E+02  2.06E-05
                               FCBBACGCFBBCCBBBHHBBBB    0.0209    3  5.24E+02  8.07E-06
                               FCCBAAGCFBBBCBBBHHABBB    0.0624    4  5.08E+02  2.34E-05
                               FCCBAAGCFBBCCBBBHHABBB    0.1055    3  5.24E+02  4.08E-05

     TBUX        3.58E-08                                                    4.09E-05
                               EBACCCFGFDBCBADBFCBABB    0.2257    5  1.24E+03  1.00E-05
                               EBACCCGGDDBCBABBFABABB    0.1186    7  7.28E+03  3.09E-05

     TBU         7.21E-08                                                    3.11E-05
                               EBAACCFGFDBCBADBEHBBBB    0.3474    5  1.24E+03  3.11E-05

     TCSX        6.93E-08                                                    7.51E-05
                               BAACACGBFAACCBBBHHABBB    0.6373   28  1.70E+03  7.51E-05

     TCSRV23     2.02E-08                                                    1.36E-05
                               DABAACGADDACBBBBHGABAB    0.3473   31  1.60E+03  1.12E-05
                               DACAAAGADDACCBBBHHABBB    0.3656   22  3.23E+02  2.39E-06
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TB              0.77
     TBUX            0.06
```

```
      TBU            0.04
      TCSX           0.11
      TCSRV23        0.02
0     LATENT CANCERS

      FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
      BAACACGBFAACCBBBHHABBB       0.11
      DABAACGADDACBBBBHGABAB       0.02
      EBAACCFGFDBCBADBEHBBBB       0.04
      EBACCCFGFDBCBADBFCBABB       0.01
      EBACCCGGDDBCBABBFABABB       0.04
      FCACBBGEFCBCCABBGCBABA       0.01
      FCACCCFGFDBCBABBGCBABB       0.02
      FCACCCFGFDBCBADBGCBABB       0.09
      FCACCCGEFDBCCABBGCBABB       0.07
      FCACCCGGDDBCBABBGABABB       0.30
      FCACCCGGEDBCBABBGCBABB       0.05
      FCBBAAGCFBBBCBBBHHABBB       0.02
      FCBBAAGCFBBCCBBBHHABBB       0.03
      FCBBACGCFBBBCBBBHHABBB       0.04
      FCBBACGCFBBCCBBBHHABBB       0.03
      FCBBACGCFBBCCBBBHHBBBB       0.01
      FCCBAAGCFBBBCBBBHHABBB       0.03
      FCCBAAGCFBBCCBBBHHABBB       0.06
0     LATENT CANCERS

      FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
      PCH  3D        0.13
      PCH  4D        0.09
      PCH  5D        0.24
      PCH  6D        0.07
      PCH  7D        0.04
      PCH  8D        0.31
      PCH 28D        0.11
      PCH 31D        0.02
1     CONSEQUENCE MEASURE:  LATENT CANCERS

      DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


      SELECTION NO.  10      10-TH FROM BOTTOM      SAMPLE MEMBER   6  RISK= 7.412E-04
      ISSUE LEVELS:   3 2 1 1 2    2 3 2 1 1    1 3 2 1 1    1 2 1 1 2    1 2 2 4 3    4 4 3 2 1    3 3 1 2 3
2 2

      SEQ.          FREQ.      CFM                           PROB.      REL  CONS.    CONTRIB.

      TB            7.39E-07                                                          3.61E-04
                               FCACCCGGDDBCBABBGABABB        0.0356      5  1.24E+03  3.26E-05
                               FCACCCGGDDBCBABBGCBABB        0.1758      5  1.24E+03  1.61E-04
                               FCACCCGGDDBCBABBGFBBBB        0.0233      5  1.24E+03  2.13E-05
                               FCBBAAGCDBBBBBBBHHABBB        0.0329      4  5.08E+02  1.23E-05
                               FCBBAAGCDBBCBBBBHHABBB        0.0556      4  5.08E+02  2.09E-05
                               FCBBACGCDBBBBBBBHHABBB        0.0331      4  5.08E+02  1.24E-05
                               FCBBACGCDBBCBBBBHHABBB        0.0560      4  5.08E+02  2.10E-05
                               FCBBACGCDBBCBBBBHHBBBB        0.0219      4  5.08E+02  8.23E-06
                               FCCBAAGCFBBBCBBBHHABBB        0.0656      4  5.08E+02  2.46E-05
                               FCCBAAGCFBBCCBBBHHABBB        0.1110      4  5.08E+02  4.17E-05

      TBUX          3.58E-08                                                          3.04E-05
                               EBACCCGGDDBCBABBFCBABB        0.6861      5  1.24E+03  3.04E-05

      TBU           7.21E-08                                                          4.92E-05
                               EBAACCGGDDBCBABBEHBBBB        0.5500      5  1.24E+03  4.92E-05

      TCSX          2.31E-07                                                          7.04E-05
                               BAACAAGBDABCBBBBHHABBB        0.3496     24  3.54E+02  2.86E-05
                               BAACACGBDAACBBBBHHABBB        0.1609     24  3.54E+02  1.32E-05
                               BAACACGBDABCBBBBHHABBB        0.3496     24  3.54E+02  2.86E-05

      TCUX          3.54E-07                                                          2.16E-05
                               AAACAAGGDABCBABBEEABBB        0.4687     12  3.35E+01  5.55E-06
                               AAACACGGDABCBABBEEABBB        0.4687     19  9.66E+01  1.60E-05

      TCSRX2        5.37E-07                                                          2.08E-04
                               CAACAABGDABCBABBADABAB        0.0875     20  1.34E+02  6.30E-06
                               CAACAABGDABCBABBAFABAB        0.0872     20  1.34E+02  6.28E-06
                               CAACACBGDABCBABBADABAB        0.0875     20  1.34E+02  6.30E-06
                               CAACACBGDABCBABBAFABAB        0.0872     20  1.34E+02  6.28E-06
                               CAACACBGDDACBABBADABAB        0.0403     24  3.54E+02  7.66E-06
                               CAACACBGDDACBABBAFABAB        0.0401     24  3.54E+02  7.63E-06
                               DAAAAAGBDABCBBBBHHABBB        0.2054     22  3.23E+02  3.57E-05
                               DAAAAAGBDDACBBBBHHABBB        0.0945     29  6.24E+02  3.17E-05
                               DAAAACGBDABCBBBBHHABBB        0.2054     24  3.54E+02  3.91E-05
                               DAAAACGBDDACBBBBHHABBB        0.0945     37  1.21E+03  6.15E-05
0     LATENT CANCERS
```

```
     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TB              0.49
     TBUX            0.04
     TBU             0.07
     TCSX            0.10
     TCUX            0.03
     TCSJX2          0.28
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     AAACACGGDABCBABBEEABBB      0.02
     BAACAAGBDABCBBBBHHABBB      0.04
     BAACACGBDAACBBBBHHABBB      0.02
     BAACACGBDABCBBBBHHABBB      0.04
     CAACACBGDDACBABBADABAB      0.01
     CAACACBGDDACBABBAFABAB      0.01
     DAAAAAGBDABCBBBBHHABBB      0.05
     DAAAAAGBDDACBBBBHHABBB      0.04
     DAAAACGBDABCBBBBHHABBB      0.05
     DAAAACGBDDACBBBBHHABBB      0.08
     EBAACCGGDDBCBABBEHBBBB      0.07
     EBACCCGGDDBCBABBFCBABB      0.04
     FCACCCGGDDBCBABBGABABB      0.04
     FCACCCGGDDBCBABBGCBABB      0.22
     FCACCCGGDDBCBABBGFBBBB      0.03
     FCBBAAGCDBBBBBBBHHABBB      0.02
     FCBBAAGCDBBCBBBBHHABBB      0.03
     FCBBACGCDBBBBBBBHHABBB      0.02
     FCBBACGCDBBCBBBBHHABBB      0.03
     FCBBACGCDBBCBBBBHHBBBB      0.01
     FCCBAAGCFBBBCBBBHHABBB      0.03
     FCCBAAGCFBBCCBBBHHABBB      0.06
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  4D         0.19
     PCH  5D         0.40
     PCH 19D         0.02
     PCH 20D         0.03
     PCH 22D         0.05
     PCH 24D         0.17
     PCH 29D         0.04
     PCH 37D         0.08
1    CONSEQUENCE MEASURE:  LATENT CANCERS

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.  11     141-TH FROM BOTTOM     SAMPLE MEMBER  22  RISK= 7.488E-02
     ISSUE LEVELS:   3 4 4 1 2    3 3 2 2 1    3 2 2 2 2    3 1 2 1 2    2 2 2 2 2    4 4 3 1 2    3 3 2 1 1
5 5

     SEQ.          FREQ.      CFM                        PROB.      REL  CONS.  CONTRIB.

     TBUX        3.50E-05                                                       7.42E-02
                            EBACBBGGDCBCBABBFFABBA    0.0701     4  5.08E+02  1.25E-03
                            EBACBCGGDCBCBABBFFABBA    0.0701     4  5.08E+02  1.25E-03
                            EBACCCGGDDBCBABBFFABBB    0.6179     6  3.31E+03  7.16E-02
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TBUX            0.99
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     EBACBBGGDCBCBABBFFABBA      0.02
     EBACBCGGDCBCBABBFFABBA      0.02
     EBACCCGGDDBCBABBFFABBB      0.96
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  4D         0.03
     PCH  6D         0.97
1    CONSEQUENCE MEASURE:  LATENT CANCERS

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.  12     142-TH FROM BOTTOM     SAMPLE MEMBER  90  RISK= 7.758E-02
     ISSUE LEVELS:   3 4 3 1 2    2 2 2 3 1    6 3 2 2 2    3 5 1 1 2    1 2 2 2 4    2 5 3 2 2    3 4 2 2 2
2 7

     SEQ.          FREQ.      CFM                        PROB.      REL  CONS.  CONTRIB.

     TBUX        3.50E-05                                                       7.68E-02
                            EBACBBGGDCBCBABBFEABBA    0.0709     4  5.08E+02  1.26E-03
```

```
                          EBACBCGGDCBCBABBFEABBA    0.0709    5  1.24E+03  3.08E-03
                          EBACCCGGDDBCBABBFEABBB    0.6247    6  3.31E+03  7.24E-02
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TBUX           0.99
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     EBACBBGGDCBCBABBFEABBA       0.02
     EBACBCGGDCBCBABBFEABBA       0.04
     EBACCCGGDDBCBABBFEABBB       0.93
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  4D        0.02
     PCH  5D        0.04
     PCH  6D        0.94
1    CONSEQUENCE MEASURE:  LATENT CANCERS

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.  13     143-TH FROM BOTTOM     SAMPLE MEMBER  53  RISK= 1.099E-01
     ISSUE LEVELS:   1 4 3 2 1    3 2 3 3 1    9 2 2 1 1    2 2 1 1 2    2 2 2 1 4    3 4 2 2 3    4 3 2 3 2
4 5

     SEQ.          FREQ.      CFM                           PROB.      REL  CONS.  CONTRIB.

     TBUX       3.10E-05                                                         1.10E-01
                          EBACBBGGDCBCBABBFCBABA    0.0688    5  1.24E+03  2.64E-03
                          EBACBCGGDCBCBABBFCBABA    0.0687    5  1.24E+03  2.64E-03
                          EBACCCGGDDBCBABBFABABB    0.0688    7  7.28E+03  1.55E-02
                          EBACCCGGDDBCBABBFCBABB    0.3396    7  7.28E+03  7.66E-02
                          EBACCCGGDDBCBABBFFBBBB    0.0450    7  7.28E+03  1.01E-02
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TBUX           1.00
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     EBACBBGGDCBCBABBFCBABA       0.02
     EBACBCGGDCBCBABBFCBABA       0.02
     EBACCCGGDDBCBABBFABABB       0.14
     EBACCCGGDDBCBABBFCBABB       0.70
     EBACCCGGDDBCBABBFFBBBB       0.09
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  3D        0.02
     PCH  5D        0.05
     PCH  7D        0.93
1    CONSEQUENCE MEASURE:  LATENT CANCERS

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.  14     144-TH FROM BOTTOM     SAMPLE MEMBER 115  RISK= 1.109E-01
     ISSUE LEVELS:   2 4 3 1 3    4 2 3 2 1    6 2 2 2 1    3 3 1 2 2    2 2 3 3 2    2 2 3 2 4    3 3 2 1 3
3 5

     SEQ.          FREQ.      CFM                           PROB.      REL  CONS.  CONTRIB.

     TB         1.57E-06                                                         4.27E-03
                          FCACCCGGDDBCBABBDCBABB    0.3299    8  8.23E+03  4.27E-03

     TBUX       3.72E-05                                                         1.07E-01
                          EBACCCFGFDBCBABBFCBABB    0.1435    5  1.24E+03  6.62E-03
                          EBACCCFGFDBCBACBFCBABB    0.0285    5  1.24E+03  1.31E-03
                          EBACCCFGFDBCBADBFCBABB    0.2563    5  1.24E+03  1.18E-02
                          EBACCCFGFDBCBADBFEBBBB    0.0347    5  1.24E+03  1.60E-03
                          EBACCCGGDDBCBABBFABABB    0.1225    8  8.23E+03  3.75E-02
                          EBACCCGGDDBCBABBFCBABB    0.0138    8  8.23E+03  4.21E-03
                          EBACCCGGEDBCBABBFCBABB    0.1435    7  7.28E+03  3.88E-02
                          EBACCCGGEDBCBABBFEBBBB    0.0194    6  3.31E+03  2.39E-03
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TB             0.04
     TBUX           0.96
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     EBACCCFGFDBCBABBFCBABB       0.06
     EBACCCFGFDBCBACBFCBABB       0.01
```

BEST COPY AVAILABLE

```
     EBACCCFGFDBCBADBFCBABB       0.11
     EBACCCFGFDBCBADBFEBBBB       0.01
     EBACCCGGDDBCBABBFABABB       0.34
     EBACCCGGDDBCBABBFCBABB       0.04
     EBACCCGGEDBCBABBFCBABB       0.35
     EBACCCGGEDBCBABBFEBBBB       0.02
     FCACCCGGDDBCBABBDCBABB       0.04
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  3D          0.02
     PCH  5D          0.19
     PCH  6D          0.02
     PCH  7D          0.35
     PCH  8D          0.41
1    CONSEQUENCE MEASURE:  LATENT CANCERS

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.  15     145-TH FROM BOTTOM     SAMPLE MEMBER  34  RISK= 1.343E-01
     ISSUE LEVELS:    4 4 3 2 1    2 4 3 2 1    5 1 2 1 1    2 1 2 1 2    1 2 1 2 3    2 2 4 4 2    3 2 2 3 1
5 7

     SEQ.          FREQ.      CFM                        PROB.      REL  CONS.  CONTRIB.

     TBUX        3.10E-05                                                        1.33E-01
                              EBACBBGGDCBCBABBFBBABA     0.0686     6  3.31E+03  7.03E-03
                              EBACBCGGDCBCBABBFBBABA     0.0685     6  3.31E+03  7.02E-03
                              EBACBCGGDCBCBABBFFBBBA     0.0163     6  3.31E+03  1.67E-03
                              EBACCCGGDDBCBABBFABABB     0.0686     8  8.23E+03  1.75E-02
                              EBACCCGGDDBCBABBFBBABB     0.3386     8  8.23E+03  8.63E-02
                              EBACCCGGDDBCBABBFFBBBB     0.0440     8  8.23E+03  1.14E-02
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TBUX             0.99
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     EBACBBGGDCBCBABBFBBABA       0.05
     EBACBCGGDCBCBABBFBBABA       0.05
     EBACBCGGDCBCBABBFFBBBA       0.01
     EBACCCGGDDBCBABBFABABB       0.13
     EBACCCGGDDBCBABBFBBABB       0.64
     EBACCCGGDDBCBABBFFBBBB       0.09
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  4D          0.01
     PCH  6D          0.12
     PCH  8D          0.86
1    CONSEQUENCE MEASURE:  LATENT CANCERS

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.  16     146-TH FROM BOTTOM     SAMPLE MEMBER 120  RISK= 1.742E-01
     ISSUE LEVELS:    3 4 3 1 4    3 3 1 3 2    6 2 2 1 1    2 4 1 2 2    1 1 2 2 2    3 4 3 2 4    4 4 2 1 3
2 1

     SEQ.          FREQ.      CFM                        PROB.      REL  CONS.  CONTRIB.

     TB          3.32E-06                                                        1.01E-02
                              FCACCCGGDDBCBADBECBABB     0.3708     8  8.23E+03  1.01E-02

     TBUX        3.72E-05                                                        1.64E-01
                              EBACCCFGFDBBBADBFCBABB     0.0227     6  3.31E+03  2.80E-03
                              EBACCCFGFDBCBACBFCBABB     0.0239     6  3.31E+03  2.95E-03
                              EBACCCFGFDBCBADBFCBABB     0.3453     6  3.31E+03  4.25E-02
                              EBACCCFGFDBCBADBFEBBBB     0.0468     5  1.24E+03  2.16E-03
                              EBACCCGEFDBCCADBFCBABB     0.1820     6  3.31E+03  2.24E-02
                              EBACCCGEFDBCCADBFEBBBB     0.0247     6  3.31E+03  3.03E-03
                              EBACCCGGDDBBBADBFABABB     0.0093     8  8.23E+03  2.84E-03
                              EBACCCGGDDBCBADBFABABB     0.1411     8  8.23E+03  4.32E-02
                              EBACCCGGDDBCBADBFCBABB     0.0159     8  8.23E+03  4.87E-03
                              EBACCCGGEDBCBADBFCBABB     0.1298     7  7.28E+03  3.51E-02
                              EBACCCGGEDBCBADBFEBBBB     0.0176     6  3.31E+03  2.17E-03
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TB               0.06
     TBUX             0.94
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
```

```
       EBACCCFGFDBBBADBFCBABB      0.02
       EBACCCFGFDBCBACBFCBABB      0.02
       EBACCCFGFDBCBADBFCBABB      0.24
       EBACCCFGFDBCBADBFEBBBB      0.01
       EBACCCGEFDBCCADBFCBABB      0.13
       EBACCCGEFDBCCADBFEBBBB      0.02
       EBACCCGGDDBBBADBFABABB      0.02
       EBACCCGGDDBCBADBFABABB      0.25
       EBACCCGGDDBCBADBFCBABB      0.03
       EBACCCGGEDBCBADBFCBABB      0.20
       EBACCCGGEDBCBADBFEBBBB      0.01
       FCACCCGGDDBCBADBECBABB      0.06
0      LATENT CANCERS

       FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
       PCH  5D         0.01
       PCH  6D         0.44
       PCH  7D         0.20
       PCH  8D         0.35
1      CONSEQUENCE MEASURE:  LATENT CANCERS

       DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


       SELECTION NO.  17     147-TH FROM BOTTOM     SAMPLE MEMBER  74  RISK= 1.872E-01
       ISSUE LEVELS:   4 4 3 2 2   3 2 2 2 1   6 3 2 1 1   2 3 2 1 2   1 2 3 2 4   2 2 3 3 3   3 3 2 1 3
2 8

       SEQ.          FREQ.      CFM                           PROB.      REL  CONS.  CONTRIB.

       TBUX        3.50E-05                                                       1.84E-01
                              EBACBBGGDCBCBABBFBBABA   0.0527     5  1.24E+03  2.29E-03
                              EBACBCGGDCBCBAPBFBBABA   0.0525     5  1.24E+03  2.28E-03
                              EBACCCGGDDBCBABBFABABB   0.0937     8  8.23E+03  2.70E-02
                              EBACCCGGDDBCBABBFBBABB   0.4629     8  8.23E+03  1.33E-01
                              EBACCCGGDDBCBABBFEBBBB   0.0613     8  8.23E+03  1.77E-02
0      LATENT CANCERS

       FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
       TBUX            0.98
0      LATENT CANCERS

       FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
       EBACBBGGDCBCBABBFBBABA      0.01
       EBACBCGGDCBCBABBFBBABA      0.01
       EBACCCGGDDBCBABBFABABB      0.14
       EBACCCGGDDBCBABBFBBABB      0.71
       EBACCCGGDDBCBABBFEBBBB      0.09
0      LATENT CANCERS

       FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
       PCH  5D         0.02
       PCH  8D         0.96
1      CONSEQUENCE MEASURE:  LATENT CANCERS

       DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


       SELECTION NO.  18     148-TH FROM BOTTOM     SAMPLE MEMBER  28  RISK= 2.179E-01
       ISSUE LEVELS:   3 4 2 2 3   2 2 3 2 1   3 3 2 2 1   2 5 3 2 1   2 2 3 2 2   2 4 3 2 3   3 4 2 1 3
5 2

       SEQ.          FREQ.      CFM                           PROB.      REL  CONS.  CONTRIB.

       TB          1.57E-06                                                       5.16E-03
                              FCACCCGGDDBCBABBEBBABB   0.3985     8  8.23E+03  5.16E-03

       TBUX        3.72E-05                                                       2.13E-01
                              EBACCCGGDDBCBABBFABABB   0.1192     7  7.28E+03  3.23E-02
                              EBACCCGGDDBCBABBFBBABB   0.5884     7  7.28E+03  1.59E-01
                              EBACCCGGDDBCBABBFCBBBB   0.0390     7  7.28E+03  1.05E-02
                              EBACCCGGEDBCBABBFCBBBB   0.0282     7  7.28E+03  7.64E-03
0      LATENT CANCERS

       FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
       TB              0.02
       TBUX            0.98
0      LATENT CANCERS

       FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
       EBACCCGGDDBCBABBFABABB      0.15
       EBACCCGGDDBCBABBFBBABB      0.73
       EBACCCGGDDBCBABBFCBBBB      0.05
       EBACCCGGEDBCBABBFCBBBB      0.04
       FCACCCGGDDBCBABBEBBABB      0.02
0      LATENT CANCERS
```

```
     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  5D          0.01
     PCH  7D          0.96
     PCH  8D          0.02
1    CONSEQUENCE MEASURE:  LATENT CANCERS

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.  19     149-TH FROM BOTTOM     SAMPLE MEMBER  20  RISK= 2.476E-01
     ISSUE LEVELS:   2 4 2 1 2    3 4 4 3 1    5 3 2 1 1    3 1 2 1 1    1 1 1 2 3    4 4 2 4 3    3 3 1 1 2
1 8

     SEQ.          FREQ.      CFM                         PROB.      REL  CONS.  CONTRIB.

     TBUX        3.50E-05                                                        2.46E-01
                            EBACBBGGDCBCBABBFBBABA      0.0526     7  7.28E+03  1.34E-02
                            EBACBCGGDCBCBADBFBBABA      0.0525     7  7.28E+03  1.34E-02
                            EBACCCGGDDBCBADBFABABB      0.0936     9  9.97E+03  3.27E-02
                            EBACCCGGDDBCBADBFBBABB      0.4624     9  9.97E+03  1.61E-01
                            EBACCCGGDDBCBADBFFBBBB      0.0612     9  9.97E+03  2.14E-02
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TBUX             0.99
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     EBACBBGGDCBCBABBFBBABA       0.05
     EBACBCGGDCBCBADBFBBABA       0.05
     EBACCCGGDDBCBADBFABABB       0.13
     EBACCCGGDDBCBADBFBBABB       0.65
     EBACCCGGDDBCBADBFFBBBB       0.09
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  5D          0.01
     PCH  7D          0.11
     PCH  9D          0.88
1    CONSEQUENCE MEASURE:  LATENT CANCERS

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.  20     150-TH FROM BOTTOM     SAMPLE MEMBER 149  RISK= 2.515E-01
     ISSUE LEVELS:   2 4 3 1 3    4 1 2 3 1    6 2 2 2 1    3 2 3 1 2    1 2 1 2 2    2 5 3 3 2    3 4 1 3 2
1 7

     SEQ.          FREQ.      CFM                         PROB.      REL  CONS.  CONTRIB.

     TB          1.57E-06                                                        5.26E-03
                            FCACCCGGDDBCBABBDBBABB      0.4064     8  8.23E+03  5.26E-03

     TBUX        3.72E-05                                                        2.46E-01
                            EBACBCGGDCBCBABBFBBABA      0.0264     6  3.31E+03  3.25E-03
                            EBACCCGGDDBCBABBFABABB      0.1196     8  8.23E+03  3.66E-02
                            EBACCCGGDDBCBABBFBBABB      0.5907     8  8.23E+03  1.81E-01
                            EBACCCGGDDBCBABBFEBBBB      0.0782     8  8.23E+03  2.39E-02
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TB               0.02
     TBUX             0.98
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     EBACBCGGDCBCBABBFBBABA       0.01
     EBACCCGGDDBCBABBFABABB       0.15
     EBACCCGGDDBCBABBFBBABB       0.72
     EBACCCGGDDBCBABBFEBBBB       0.10
     FCACCCGGDDBCBABBDBBABB       0.02
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  6D          0.01
     PCH  8D          0.98
```

C.2 LISTING OF RISQUE OUTPUT: LLH ESTIMATE WITH CRAC2 CONSEQUENCES

```
BASE CASE:  PEACH BOTTOM LLH (C
  Specific information concerning input data follows :
  HEADER : CONS. BY CRAC2, SEQ BY TEMAC, ST BY RELTRAC
  SEQUENCES : P.B. SEQ. FREQS. FOR LALH: 1=TB,2=TBUX,3=TBU,4=TCSX,5=TCUX,6=TCSRX2,7=TCSRV23
  CONTAINMENT FAILURE MODES : PEACH BOTTOM LLH - BASE & S.O. MASTER KEEP BIN FILE - 3 DEC 86
  RELEASES :  PEACH BOTTOM EXPANDED CLUSTER ASSIGNMENT FILE
  CONSEQUENCES : CONSEQUENCES BY CRAC2 11/12/86

  RESULTS ARE ABSOLUTE RISK PER YEAR
  BASE CASE OUTPUT WILL BE PRINTED
1  SORTED MELTDOWN FREQUENCIES
   PROBABILITY          CUM. PROB.          FREQUENCY
     6.667E-03          6.667E-03          8.222E-07
     6.667E-03          1.333E-02          8.242E-07
     6.667E-03          2.000E-02          9.747E-07
     6.667E-03          2.667E-02          1.027E-06
     6.667E-03          3.333E-02          1.252E-06
     6.667E-03          4.000E-02          1.254E-06
     6.667E-03          4.667E-02          1.270E-06
     6.667E-03          5.333E-02          1.285E-06
     6.667E-03          6.000E-02          1.301E-06
     6.667E-03          6.667E-02          1.301E-06
     6.667E-03          7.333E-02          1.301E-06
     6.667E-03          8.000E-02          1.301E-06
     6.667E-03          8.667E-02          1.301E-06
     6.667E-03          9.333E-02          1.303E-06
     6.667E-03          1.000E-01          1.303E-06
     6.667E-03          1.067E-01          1.417E-06
     6.667E-03          1.133E-01          1.434E-06
     6.667E-03          1.200E-01          1.469E-06
     6.667E-03          1.267E-01          1.483E-06
     6.667E-03          1.333E-01          1.483E-06
     6.667E-03          1.400E-01          1.499E-06
     6.667E-03          1.467E-01          1.506E-06
     6.667E-03          1.533E-01          1.598E-06
     6.667E-03          1.600E-01          1.628E-06
     6.667E-03          1.667E-01          1.693E-06
     6.667E-03          1.733E-01          1.804E-06
     6.667E-03          1.800E-01          1.969E-06
     6.667E-03          1.867E-01          2.073E-06
     6.667E-03          1.933E-01          2.073E-06
     6.667E-03          2.000E-01          2.107E-06
     6.667E-03          2.067E-01          2.107E-06
     6.667E-03          2.133E-01          2.110E-06
     6.667E-03          2.200E-01          2.112E-06
     6.667E-03          2.267E-01          2.113E-06
     6.667E-03          2.333E-01          2.131E-06
     6.667E-03          2.400E-01          2.141E-06
     6.667E-03          2.467E-01          2.145E-06
     6.667E-03          2.533E-01          2.147E-06
     6.667E-03          2.600E-01          2.172E-06
     6.667E-03          2.667E-01          2.172E-06
     6.667E-03          2.733E-01          2.200E-06
     6.667E-03          2.800E-01          2.274E-06
     6.667E-03          2.867E-01          2.327E-06
     6.667E-03          2.933E-01          2.330E-06
     6.667E-03          3.000E-01          2.343E-06
     6.667E-03          3.067E-01          2.343E-06
     6.667E-03          3.133E-01          2.347E-06
     6.667E-03          3.200E-01          2.347E-06
     6.667E-03          3.267E-01          2.350E-06
     6.667E-03          3.333E-01          2.350E-06
     6.667E-03          3.400E-01          2.350E-06
     6.667E-03          3.467E-01          2.350E-06
     6.667E-03          3.533E-01          2.813E-06
     6.667E-03          3.600E-01          2.813E-06
     6.667E-03          3.667E-01          2.951E-06
     6.667E-03          3.733E-01          2.951E-06
     6.667E-03          3.800E-01          3.004E-06
     6.667E-03          3.867E-01          3.016E-06
     6.667E-03          3.933E-01          3.016E-06
     6.667E-03          4.000E-01          3.016E-06
     6.667E-03          4.067E-01          3.016E-06
     6.667E-03          4.133E-01          3.017E-06
     6.667E-03          4.200E-01          3.033E-06
     6.667E-03          4.267E-01          3.039E-06
     6.667E-03          4.333E-01          3.044E-06
     6.667E-03          4.400E-01          3.094E-06
     6.667E-03          4.467E-01          3.094E-06
     6.667E-03          4.533E-01          3.216E-06
     6.667E-03          4.600E-01          3.230E-06
```

```
      6.667E-03          4.667E-01          3.236E-06
      6.667E-03          4.733E-01          3.785E-06
      6.667E-03          4.800E-01          3.799E-06
      6.667E-03          4.867E-01          3.799E-06
      6.667E-03          4.933E-01          3.799E-06
      6.667E-03          5.000E-01          3.801E-06
      6.667E-03          5.067E-01          3.802E-06
      6.667E-03          5.133E-01          3.866E-06
      6.667E-03          5.200E-01          3.898E-06
      6.667E-03          5.267E-01          3.898E-06
      6.667E-03          5.333E-01          3.899E-06
      6.667E-03          5.400E-01          3.901E-06
      6.667E-03          5.467E-01          3.932E-06
      6.667E-03          5.533E-01          3.967E-06
      6.667E-03          5.600E-01          3.981E-06
      6.667E-03          5.667E-01          3.981E-06
      6.667E-03          5.733E-01          3.981E-06
      6.667E-03          5.800E-01          3.981E-06
      6.667E-03          5.867E-01          3.984E-06
      6.667E-03          5.933E-01          3.997E-06
      6.667E-03          6.000E-01          3.997E-06
      6.667E-03          6.067E-01          4.001E-06
      6.667E-03          6.133E-01          4.004E-06
      6.667E-03          6.200E-01          4.006E-06
      6.667E-03          6.267E-01          4.031E-06
      6.667E-03          6.333E-01          4.031E-06
      6.667E-03          6.400E-01          4.068E-06
      6.667E-03          6.467E-01          4.103E-06
      6.667E-03          6.533E-01          4.467E-06
      6.667E-03          6.600E-01          4.605E-06
      6.667E-03          6.667E-01          4.605E-06
      6.667E-03          6.733E-01          4.605E-06
      6.667E-03          6.800E-01          4.670E-06
      6.667E-03          6.867E-01          4.693E-06
      6.667E-03          6.933E-01          4.772E-06
      6.667E-03          7.000E-01          4.772E-06
      6.667E-03          7.067E-01          4.782E-06
      6.667E-03          7.133E-01          4.783E-06
      6.667E-03          7.200E-01          4.793E-06
      6.667E-03          7.267E-01          4.793E-06
      6.667E-03          7.333E-01          4.797E-06
      6.667E-03          7.400E-01          4.797E-06
      6.667E-03          7.467E-01          4.797E-06
      6.667E-03          7.533E-01          4.799E-06
      6.667E-03          7.600E-01          4.800E-06
      6.667E-03          7.667E-01          4.938E-06
      6.667E-03          7.733E-01          4.979E-06
      6.667E-03          7.800E-01          4.995E-06
      6.667E-03          7.867E-01          4.995E-06
      6.667E-03          7.933E-01          4.999E-06
      6.667E-03          8.000E-01          4.999E-06
      6.667E-03          8.067E-01          4.999E-06
      6.667E-03          8.133E-01          4.999E-06
      6.667E-03          8.200E-01          5.002E-06
      6.667E-03          8.267E-01          5.002E-06
      6.667E-03          8.333E-01          5.006E-06
      6.667E-03          8.400E-01          5.603E-06
      6.667E-03          8.467E-01          5.603E-06
      6.667E-03          8.533E-01          5.691E-06
      6.667E-03          8.600E-01          5.770E-06
      6.667E-03          8.667E-01          5.770E-06
      6.667E-03          8.733E-01          6.552E-06
      6.667E-03          8.800E-01          6.553E-06
      6.667E-03          8.867E-01          6.749E-06
      6.667E-03          8.933E-01          7.206E-06
      6.667E-03          9.000E-01          7.305E-06
      6.667E-03          9.067E-01          3.175E-05
      6.667E-03          9.133E-01          3.517E-05
      6.667E-03          9.200E-01          3.630E-05
      6.667E-03          9.267E-01          3.648E-05
      6.667E-03          9.333E-01          3.650E-05
      6.667E-03          9.400E-01          3.650E-05
      6.667E-03          9.467E-01          3.727E-05
      6.667E-03          9.533E-01          3.929E-05
      6.667E-03          9.600E-01          3.929E-05
      6.667E-03          9.667E-01          3.929E-05
      6.667E-03          9.733E-01          3.949E-05
      6.667E-03          9.800E-01          4.019E-05
      6.667E-03          9.867E-01          4.105E-05
      6.667E-03          9.933E-01          4.125E-05
      6.667E-03          1.000E+00          4.185E-05
 MEAN =     6.820E-06     VARIANCE =     1.123E-10
 PERCENTILES :
      5-TH =     1.278E-06  50-TH =     3.801E-06  95-TH =     3.827E-05
```

```
CONSEQUENCE MEASURE:
 EARLY FATALITIES


 BASE CASE :
  PEACH BOTTOM LLH (CRAC2)

 ISSUE LEVELS FOR EACH SAMPLE MEMBER, IN ORDER OF INCREASING RISK
          RISK  ISSUE LEVELS, FOR ALL ISSUES
               1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
 1.189E-09     3  2  3  2  3  2  4  3  1  1  8  3  1  2  2  3  4  2  2  2  1  2  2  2  4  2  2  2  2  2  1  2
 2.869E-09     3  2  2  1  3  3  3  2  3  1  5  3  2  2  2  1  2  3  2  2  2  2  2  1  4  2  4  3  2  2  4  1
 5.652E-09     2  2  2  1  1  2  3  3  4  1  6  3  2  2  2  1  2  1  2  2  2  2  2  2  2  2  4  3  3  2  2  2
 5.817E-09     3  3  2  2  3  3  3  1  1  1  9  3  2  1  1  1  3  2  2  1  2  2  1  3  2  3  4  2  2  1  2  1
 5.918E-09     3  3  3  1  1  1  2  2  3  1  4  3  2  1  2  2  2  2  2  1  2  2  3  1  2  2  2  3  1  2  4  3
 6.308E-09     2  1  2  2  1  4  1  3  3  1  3  3  1  2  2  2  2  2  2  1  2  2  1  2  2  3  4  3  2  1  4  3
 7.249E-09     3  3  2  1  1  2  3  3  2  1  6  2  2  1  2  2  2  2  2  2  2  2  2  4  3  2  4  4  1  1  1  2
 7.686E-09     2  2  3  1  1  3  2  3  2  1  6  2  2  2  1  3  5  2  1  1  1  2  2  3  5  4  3  3  1  2  4  2
 1.071E-08     2  3  1  1  3  3  3  4  3  2  5  2  2  1  2  3  3  2  1  2  2  2  3  2  4  2  3  3  2  1  3  2
 1.092E-08     2  2  2  1  4  2  2  3  2  1  7  3  2  1  2  1  1  2  2  2  1  2  2  3  4  2  3  3  3  2  4  4
 1.343E-08     1  3  3  2  1  3  2  2  3  2  3  2  2  1  2  3  3  1  1  1  2  2  2  4  4  2  2  3  3  1  3  2
 1.381E-08     1  3  3  1  2  3  2  1  3  1  6  2  2  2  2  3  5  3  2  1  1  2  2  4  4  3  4  3  3  1  1  3
 1.860E-08     3  3  1  1  1  2  3  4  3  1  6  2  2  2  2  2  1  2  2  2  2  2  2  3  4  2  3  2  3  2  2  3
 1.991E-08     2  2  2  2  2  2  3  3  3  1  8  2  2  1  1  2  2  1  2  2  1  2  1  2  1  2  3  2  1  1  4  3
 2.014E-08     1  3  2  1  3  3  4  2  3  1  3  3  2  1  2  2  2  3  2  2  2  2  2  1  2  2  3  2  1  3  3  2
 2.230E-08     3  3  1  1  2  3  4  3  3  1  3  3  2  2  1  2  2  1  1  2  1  2  2  2  2  2  2  3  3  1  4  3
 2.376E-08     3  1  3  2  4  2  1  3  3  1  7  3  2  2  2  1  3  1  2  1  1  2  2  2  2  2  3  4  2  2  3  2
 2.768E-08     3  2  3  2  1  2  3  2  2  1  7  2  2  2  1  3  1  2  2  1  1  1  3  3  2  2  1  2  2  2  4  3
 2.793E-08     2  2  2  1  2  2  2  3  3  1  9  2  2  2  1  2  4  2  2  2  2  2  1  2  4  5  4  2  2  2  4  3
 2.911E-08     2  3  2  2  3  2  2  2  2  1  4  1  2  2  2  1  3  2  2  1  1  2  2  1  4  2  2  3  2  2  3  4
 3.324E-08     2  2  2  2  2  2  2  2  3  1  6  2  2  1  1  1  1  1  2  2  1  2  2  1  2  4  2  3  3  2  1  3
 3.332E-08     3  2  3  1  3  4  3  2  2  2  8  2  2  1  2  2  2  1  2  1  2  2  1  3  5  3  2  3  1  3  3  4
 3.639E-08     3  2  1  1  3  1  1  3  4  1  9  2  2  2  2  2  4  2  2  2  1  2  2  2  2  4  2  3  2  3  3  2
 3.716E-08     3  3  2  1  2  2  2  3  2  1  6  2  2  1  2  2  1  1  2  1  2  2  1  2  2  2  3  3  2  3  3  2
 3.940E-08     3  2  1  1  2  2  3  2  1  1  1  3  2  1  1  1  2  1  1  2  1  2  2  4  3  4  4  3  2  1  3  3
 4.252E-08     2  2  4  1  4  2  3  3  3  1  6  2  2  2  1  3  2  2  2  2  1  2  1  1  2  2  2  3  2  1  4  3
 4.524E-08     2  2  3  2  2  3  3  4  4  1  6  2  2  2  1  1  2  2  2  2  2  2  2  3  2  2  3  3  3  1  3  4
 5.115E-08     4  3  3  1  3  2  3  1  3  2  6  3  2  2  2  3  3  1  2  2  2  2  1  1  3  2  2  2  3  2  2  2
 5.228E-08     2  2  3  2  3  4  2  3  3  1  6  2  2  1  2  4  1  2  2  2  1  1  2  4  2  2  3  2  1  2  3  2
 5.511E-08     4  2  3  2  2  3  3  1  2  2  7  2  2  2  1  2  1  2  2  2  1  2  2  3  3  3  2  3  3  1  4  3
 5.540E-08     2  2  2  1  2  4  3  3  2  1  8  2  2  2  2  3  2  1  2  2  1  2  3  1  3  2  4  4  3  1  3  4
 5.965E-08     2  3  3  1  4  2  2  3  3  1  6  2  2  2  1  2  4  2  1  1  1  2  3  3  3  4  3  2  1  2  4  3
 6.577E-08     2  2  2  2  2  1  3  3  2  1  6  3  2  2  2  2  2  2  1  2  2  2  2  2  4  2  4  2  2  2  3  3
 6.940E-08     2  3  3  2  2  2  2  2  2  1  2  3  2  1  2  3  2  2  2  2  2  2  2  2  5  2  2  3  4  2  2  3
 8.930E-08     3  3  1  2  2  3  2  2  1  1  6  1  1  1  1  4  3  2  2  2  2  2  2  1  3  1  4  2  1  3  4  2
 9.182E-08     3  2  1  2  3  2  3  2  3  1  2  3  1  1  2  3  3  1  2  2  2  2  2  3  1  2  2  3  2  3  3  3
 9.710E-08     3  2  3  1  1  3  3  4  2  1  5  3  2  1  1  2  3  2  1  2  1  2  3  3  1  2  3  3  1  3  4  3
 9.826E-08     4  3  3  1  2  3  3  3  2  1  6  2  2  1  2  2  2  1  2  1  2  2  2  3  3  4  2  3  3  2  2  3
 1.017E-07     3  3  4  2  2  3  2  3  2  1  7  2  1  1  1  2  1  2  2  1  1  2  2  4  3  2  2  1  2  3  2  3
 1.150E-07     2  3  1  2  3  3  2  3  2  1  4  2  2  2  1  2  2  2  2  1  1  2  3  3  2  3  3  3  4  1  3  2
 1.205E-07     2  3  3  1  1  3  2  3  3  2  7  2  2  2  1  2  2  2  2  2  1  2  2  3  4  1  3  3  2  3  4  3
 1.218E-07     3  4  2  2  4  3  2  3  2  1  5  2  2  2  2  2  4  2  2  1  2  2  3  3  2  2  3  2  3  2  4  2
 1.284E-07     3  2  2  1  3  2  3  3  4  1  7  2  1  1  1  2  3  2  2  2  2  2  3  3  4  4  2  3  3  3  3  1
 1.298E-07     2  1  3  2  2  4  3  2  2  1  7  2  2  1  2  1  3  1  1  1  2  1  3  1  2  4  1  2  2  2  4  3
 1.324E-07     2  4  3  1  4  2  2  2  3  2  7  3  2  2  1  2  1  2  2  1  2  2  3  2  1  3  2  2  4  1  2  3
 1.430E-07     1  1  3  2  2  3  4  2  2  1  2  2  2  2  2  1  3  2  1  2  1  1  2  2  3  3  3  2  2  3  2  3
 1.454E-07     1  1  3  1  2  3  4  2  2  1  3  3  2  1  2  2  2  1  1  2  1  2  2  1  2  2  2  2  3  3  3  3
 1.492E-07     3  1  2  1  2  3  1  4  2  1  2  2  2  1  1  2  3  2  2  1  2  1  2  1  2  2  3  2  2  2  2  4
 1.513E-07     3  2  4  1  3  3  3  2  3  2  2  2  2  2  1  3  3  1  2  2  1  2  3  1  4  3  5  1  2  3  4  3
 1.521E-07     2  1  3  2  2  1  2  3  4  1  5  2  2  2  1  2  2  3  1  2  2  2  2  3  1  2  3  3  4  2  4  2
 1.534E-07     1  2  2  1  2  2  3  3  3  1  5  2  2  2  1  2  4  1  2  1  2  1  4  4  1  5  3  3  3  2  1  2
 1.540E-07     3  1  2  2  1  2  1  2  1  1  8  3  2  1  2  3  4  2  2  2  1  2  3  2  3  1  2  2  4  4  4  3
 1.561E-07     2  3  3  1  3  2  2  3  4  2  8  2  2  1  2  3  2  1  2  1  1  2  2  2  2  4  4  2  2  2  4  2
 1.699E-07     2  2  3  2  2  3  4  2  2  1  9  3  2  2  1  3  3  2  1  1  1  2  1  1  4  3  4  2  2  4  1  2
 1.727E-07     3  3  2  1  2  1  2  3  3  1  2  2  2  2  2  2  3  2  2  1  1  2  1  2  3  3  4  3  2  4  4  3
 1.798E-07     3  2  1  2  3  3  3  3  3  2  5  2  2  1  1  2  5  2  2  2  1  2  2  2  2  2  3  2  2  2  2  3
 1.871E-07     3  2  3  1  2  2  3  3  4  1  6  2  2  2  1  4  4  2  2  1  2  2  3  3  3  2  3  2  3  2  3  4
 1.946E-07     3  2  2  1  2  4  2  3  3  1  8  3  2  1  2  2  1  1  1  2  2  2  3  1  4  3  4  3  3  2  3  3
 1.953E-07     1  3  3  2  3  2  3  3  4  1  7  3  2  2  2  2  2  2  1  1  2  2  3  2  3  2  4  2  2  2  2  2
 2.312E-07     2  3  2  1  2  1  2  3  1  1  5  3  2  2  1  2  1  1  2  2  1  2  2  1  2  5  2  4  1  2  2  2
 2.406E-07     2  3  2  1  2  4  3  2  3  2  6  2  2  1  1  2  1  1  2  1  2  2  1  3  4  1  4  4  2  2  3  2
 2.582E-07     1  3  2  1  2  2  2  3  2  1  8  2  2  1  1  2  2  1  2  2  1  2  3  2  3  2  3  3  2  3  1  2
 2.709E-07     2  1  2  2  3  3  2  1  2  2  6  2  2  1  1  2  3  1  2  2  2  2  2  2  3  1  4  2  3  3  3  1
 3.011E-07     3  4  4  1  3  2  2  4  2  2  8  2  2  2  2  2  4  2  2  2  2  1  1  3  3  2  3  3  4  2  3  3
 3.084E-07     3  2  3  2  2  2  3  2  1  1  5  3  2  2  1  2  2  2  2  2  1  1  2  2  4  4  4  3  2  1  4  3
 3.120E-07     3  1  2  1  2  3  2  2  2  2  5  2  2  1  2  2  3  2  2  1  2  2  3  2  2  4  3  3  3  3  3  4
 3.196E-07     2  3  3  1  3  3  2  1  1  1  7  2  2  1  1  2  2  2  2  2  2  2  2  2  1  1  3  3  3  2  3  3
 3.548E-07     2  2  3  1  3  3  2  1  3  1  5  2  2  2  2  2  3  1  1  2  2  2  1  3  1  2  5  3  1  2  3  1
 3.555E-07     4  3  3  2  2  3  3  1  2  1  4  2  1  1  2  2  5  1  2  2  1  2  3  2  2  2  4  2  3  1  4  3
 3.571E-07     3  2  2  1  3  3  3  4  2  1  6  2  2  1  2  3  1  2  1  1  1  2  3  3  3  1  5  3  3  1  3  4
 3.745E-07     3  2  2  1  3  1  2  2  2  1  9  2  2  2  1  3  1  3  2  1  2  2  2  3  2  3  3  4  2  3  4  3
 3.919E-07     2  2  2  1  2  3  1  3  3  1  3  2  2  2  1  3  2  2  2  2  1  2  1  3  3  2  2  2  3  4  3  3
 3.979E-07     1  2  2  2  4  3  2  3  3  1  8  2  2  1  1  2  3  3  2  2  1  2  3  3  4  1  4  2  2  2  4  2
 4.027E-07     2  1  4  1  4  2  3  2  2  1  4  3  2  2  2  2  3  1  2  1  1  2  2  4  3  2  4  4  2  3  4  3
 4.065E-07     2  1  4  1  3  2  3  1  3  1  6  2  2  2  2  2  2  3  1  2  2  2  2  3  2  2  3  3  1  3  2  3
 4.122E-07     1  2  2  2  4  4  1  2  2  1  2  2  2  1  2  2  1  1  2  2  2  1  1  2  5  5  4  1  3  2  3  2
```

```
4.170E-07  3  3  2  1  3  3  1  1  4  1  5  3  2  1  2  2  3  1  2  2  2  2  2  3  1  2  4  3  3  1  2  3
4.182E-07  1  2  2  2  2  2  3  2  2  1  4  3  2  2  1  3  2  2  1  2  1  2  2  1  3  1  2  3  4  3  4  2
4.215E-07  2  2  2  1  3  4  3  2  2  1  6  3  2  2  2  3  5  2  1  1  2  2  1  4  2  2  2  3  2  2  4  3
4.250E-07  4  2  1  1  2  4  1  1  4  1  8  3  2  2  2  1  3  2  1  1  1  2  2  2  4  2  4  3  1  3  2  3
4.343E-07  1  1  2  1  2  2  4  2  2  2  6  2  2  2  1  2  4  1  1  1  2  2  2  3  4  3  4  4  4  4  3  3
4.607E-07  4  2  1  2  2  3  2  1  4  1  4  3  2  1  1  2  1  2  1  1  1  1  3  2  4  3  4  4  2  4  4  3
4.865E-07  3  2  3  1  3  3  4  4  3  1  7  2  2  2  1  3  2  1  1  1  1  2  4  3  2  3  2  3  3  3  4  2
4.896E-07  3  2  3  2  3  2  3  4  2  1  8  2  2  2  1  2  3  1  2  1  1  2  1  3  4  2  5  3  3  2  3  3
5.240E-07  2  2  2  2  2  3  3  2  2  1  9  2  2  2  1  2  3  2  1  2  2  2  2  3  1  3  5  3  3  3  4  4
5.726E-07  3  2  2  1  1  1  3  2  2  1  5  2  2  2  1  3  4  2  1  2  1  2  2  2  3  3  5  2  2  2  4  4
5.984E-07  3  2  2  1  2  3  3  2  3  1  9  2  2  1  1  2  1  2  1  2  2  1  1  4  4  2  3  3  3  2  3  2
6.089E-07  3  2  3  1  3  3  2  2  2  1  7  3  2  1  2  3  4  3  1  1  1  2  2  2  2  3  5  3  2  3  2  3
6.465E-07  3  3  2  2  2  2  3  2  2  1  8  2  2  1  2  2  2  2  2  2  2  2  3  2  2  2  5  3  3  3  4  3
6.589E-07  4  2  4  2  1  3  3  2  3  1  6  3  2  1  2  3  1  2  2  2  1  2  1  3  1  4  4  4  3  4  3  2
7.004E-07  2  2  2  2  3  1  1  3  1  1  2  2  2  1  1  3  3  1  1  2  2  2  1  2  3  2  2  3  2  4  4  2
7.608E-07  3  2  3  1  4  1  3  3  2  1  6  2  2  1  1  2  4  2  1  1  2  2  3  3  5  4  2  3  2  3  3  3
7.614E-07  2  3  1  1  3  2  3  3  3  1  7  3  2  2  1  3  2  1  2  2  2  1  2  2  2  2  4  3  2  3  3  2
7.739E-07  2  3  4  2  3  3  3  2  3  2  3  2  2  2  2  2  1  1  1  2  2  2  2  3  5  1  4  3  1  3  3  2
7.768E-07  2  3  4  2  3  2  2  2  3  1  5  2  1  2  2  2  2  1  1  1  1  2  3  1  2  2  3  3  2  2  2  3
7.987E-07  4  2  2  2  3  2  4  2  3  1  3  2  2  2  1  2  1  2  1  2  2  2  2  3  4  2  2  4  2  4  3  4
8.369E-07  3  2  3  1  3  2  2  2  2  1  3  2  2  2  2  3  3  2  2  2  1  2  2  3  4  2  1  4  3  3  3  3
8.790E-07  3  2  3  1  3  2  2  3  1  1  5  2  2  2  2  3  1  2  1  1  2  1  1  2  2  3  5  1  2  1  1  4
9.092E-07  2  3  3  2  3  3  2  3  2  1  1  2  2  1  1  3  2  2  2  2  2  2  3  2  4  4  4  2  2  3  1  3
9.899E-07  2  1  3  1  3  1  3  3  3  1  3  2  2  2  1  2  4  1  2  2  1  1  1  1  3  2  5  4  2  1  2  3
1.038E-06  3  3  3  2  2  3  3  3  2  1  6  2  1  2  1  2  4  3  2  1  1  1  2  3  3  4  3  4  2  1  4  2
1.127E-06  2  3  3  2  2  3  2  2  4  2  9  2  2  1  1  3  2  2  1  1  2  2  2  1  1  2  3  4  2  2  3  3
1.129E-06  2  3  2  1  2  2  3  2  4  1  7  2  2  1  2  3  3  1  1  2  1  2  1  2  3  1  1  3  2  2  2  3
1.133E-06  4  2  2  1  3  2  3  2  3  1  3  2  2  1  1  3  2  1  2  2  2  1  2  3  4  1  4  2  3  1  4  3
1.133E-06  2  3  4  2  2  3  1  2  3  1  6  3  2  2  2  2  2  1  1  2  1  2  2  4  2  2  3  2  4  2  4  2
1.142E-06  2  3  2  1  2  2  1  3  1  1  4  2  2  1  2  2  3  2  1  2  2  2  1  2  1  2  2  2  2  2  4  3
1.154E-06  3  3  2  2  2  2  3  3  3  2  6  2  1  2  2  3  2  1  1  1  1  2  2  3  1  3  3  2  2  3  3  3
1.265E-06  3  2  3  1  2  3  1  2  2  2  2  2  2  2  1  2  2  2  1  2  1  1  3  2  2  1  3  2  3  3  2  2
1.278E-06  3  3  4  2  2  1  2  3  3  1  4  2  2  2  2  3  5  2  1  2  2  2  2  3  2  2  4  3  2  2  4  4
1.291E-06  2  2  3  2  3  1  2  2  3  1  8  2  2  1  1  2  4  2  1  1  2  1  2  1  2  2  4  4  3  1  3  3
1.294E-06  1  2  3  1  3  2  3  2  2  1  6  2  2  1  1  2  1  2  1  1  2  2  4  3  2  1  4  4  3  4  1  2
1.296E-06  2  2  1  1  3  2  2  4  1  1  6  2  2  2  2  3  3  1  1  1  2  2  2  3  2  2  2  3  4  3  3  3
1.312E-06  3  3  2  2  2  2  2  3  2  1  3  3  2  2  2  2  3  1  1  1  1  1  2  4  3  2  2  3  2  4  2  3
1.351E-06  3  1  4  1  3  3  2  4  3  1  8  3  2  1  1  3  5  1  1  2  2  1  2  1  2  3  3  4  3  2  1  1
1.359E-06  2  3  2  1  2  3  2  1  3  1  5  2  1  1  1  3  5  2  1  2  1  2  1  2  2  5  2  3  3  2  2  3
1.370E-06  4  2  1  2  3  4  4  2  2  1  6  2  2  2  2  2  4  1  1  2  2  1  3  3  2  2  3  2  3  2  3  3
1.409E-06  3  2  2  2  2  3  2  3  4  1  2  2  2  1  1  3  5  2  2  1  1  1  2  3  3  3  5  4  3  3  4  2
1.546E-06  4  2  3  1  4  2  3  4  3  2  6  2  1  1  2  2  3  2  1  1  2  2  2  1  2  2  4  2  4  2  1  3
1.674E-06  3  2  3  2  3  2  2  3  3  1  3  2  2  1  2  2  1  3  1  1  2  2  1  3  3  3  4  4  4  3  4  2
1.748E-06  3  3  4  1  3  2  1  4  3  2  7  2  1  1  1  1  2  1  1  2  2  1  3  4  3  4  3  3  1  3  4  3
1.748E-06  2  3  2  1  3  2  3  3  1  2  5  2  1  2  2  2  2  2  1  2  2  2  2  1  4  3  3  3  3  2  4  2
1.753E-06  2  4  3  2  2  3  2  3  2  1  3  3  2  1  2  2  5  1  2  2  2  2  2  2  2  2  3  3  2  3  3  2
1.756E-06  2  3  3  1  3  2  4  3  2  1  2  3  2  1  2  1  3  2  2  2  2  2  3  3  2  4  5  3  3  3  4  3
1.778E-06  4  3  3  1  2  3  2  3  2  1  3  2  2  1  1  2  4  1  1  1  2  2  3  4  2  1  4  2  3  2  2  2
1.825E-06  2  3  3  1  3  2  3  2  3  1  7  2  1  1  2  3  2  1  1  1  1  2  2  3  3  2  4  3  2  2  4  4
1.925E-06  2  3  2  2  3  3  3  2  2  1  7  3  2  1  1  4  3  2  1  2  1  2  2  2  3  3  3  3  2  3  2  4
1.931E-06  3  3  2  1  3  2  2  2  2  1  7  3  2  1  1  3  1  3  1  2  1  2  3  1  3  4  4  4  2  3  3  1
1.991E-06  3  3  2  2  3  4  4  3  3  1  5  3  2  1  1  1  5  2  1  2  1  2  1  3  2  2  3  2  2  4  4  2
2.092E-06  4  3  3  2  3  3  2  4  3  2  3  3  2  1  2  3  2  2  1  1  1  1  3  2  4  4  2  3  2  3  3  3
2.917E-06  3  3  2  1  4  1  2  2  2  1  9  2  2  1  2  2  4  1  1  2  1  2  2  2  2  2  3  3  1  3  4  2
3.204E-06  2  3  4  1  4  4  3  3  3  1  3  3  2  2  2  3  1  1  1  1  2  2  1  2  4  4  3  2  3  2  4  3
3.403E-06  3  3  3  2  2  2  2  2  1  1  9  3  2  2  2  3  3  1  1  2  2  1  3  2  2  3  4  3  3  3  4  3
3.463E-06  2  4  2  1  3  3  2  3  3  1  6  3  2  1  1  2  4  1  2  2  1  2  2  1  5  2  3  2  3  2  3  3
3.494E-06  2  3  2  1  2  2  4  2  4  1  5  3  2  1  2  2  5  2  1  1  1  2  1  2  2  2  3  2  3  3  3  2
3.568E-06  2  3  2  1  2  3  3  3  2  1  8  1  2  1  2  2  4  3  1  1  1  2  1  3  3  2  4  3  4  3  4  3
3.715E-06  1  3  1  1  2  3  2  2  3  1  5  1  2  2  2  2  2  1  1  1  1  1  1  2  2  2  4  4  3  1  3  2
3.904E-06  2  2  2  1  4  2  3  2  1  1  9  2  2  1  2  3  1  1  1  1  1  1  2  4  4  2  3  2  3  3  4  2
5.173E-06  3  3  3  2  3  1  3  1  2  1  3  3  2  2  1  3  3  2  1  2  2  1  3  1  4  3  5  2  3  3  3  2
5.209E-06  2  3  2  1  3  2  3  2  3  1  7  2  2  2  1  2  1  3  1  2  1  2  3  3  2  4  4  2  3  4  2  2
5.282E-06  3  3  3  1  3  3  2  2  2  1  6  2  2  2  1  1  5  1  1  2  1  2  2  1  2  4  4  3  3  3  2  4
6.111E-06  3  4  4  1  2  3  3  2  2  1  3  2  2  2  2  3  1  2  1  2  2  2  2  2  2  4  4  3  1  2  3  3
6.206E-06  3  4  3  1  2  2  2  2  3  1  6  3  2  2  2  3  5  1  1  2  1  2  2  2  4  2  5  3  2  2  3  4
7.622E-06  2  4  3  1  3  4  2  3  2  1  6  2  2  2  1  3  3  1  2  2  2  2  3  3  2  2  2  3  2  4  3  3
8.867E-06  1  4  3  2  1  3  2  3  3  1  9  2  2  1  1  2  2  1  1  2  2  2  2  1  4  3  4  2  2  3  4  3
1.109E-05  4  4  3  2  1  2  4  3  2  1  5  1  2  1  1  2  1  2  1  2  1  2  1  2  3  2  2  4  4  2  3  2
1.456E-05  3  4  3  1  4  3  3  1  3  2  6  2  2  1  1  2  4  1  2  2  1  1  2  2  2  3  4  3  2  4  4  4
1.533E-05  4  4  3  2  2  3  2  2  2  1  6  3  2  1  1  2  3  2  1  2  1  2  3  2  4  2  2  3  3  3  3  3
1.852E-05  3  4  2  2  3  2  2  3  2  1  3  3  2  2  1  2  5  3  2  1  2  2  3  2  2  2  4  3  2  3  3  4
2.099E-05  2  4  3  1  3  4  1  2  3  1  6  2  2  2  1  3  2  3  1  2  1  2  1  2  2  2  5  3  3  2  3  4
4.272E-05  2  4  2  1  2  3  4  4  3  1  5  3  2  1  1  3  1  2  1  1  1  1  1  2  3  4  4  2  4  3  3  3

    MEAN =     1.758E-06      VARIANCE =     2.130E-11

    PERCENTILES :
         5-TH =     7.686E-09  50-TH =     4.094E-07  95-TH =     7.622E-06
    LOGARITHMIC MIDPOINT (OF POINTS > 0.) =     2.253E-07
    NUMBER ABOVE MIDPOINT = 91
    NUMBER BELOW MIDPOINT =  59
    CHI-SQUARED(1) =     6.827E+00
    REJECT NULL (p < .01)
```

256

```
CONSEQUENCE MEASURE:
 EARLY FATALITIES


 BASE CASE :
  PEACH BOTTOM LLN (CRAC2)

 FRACTIONAL CONTRIBUTION OF EACH SEQUENCE TO MEAN RISK
                  SEQUENCE                CONTRIBUTION
                     TB                      0.1535
                    TBUX                     0.7891
                     TBU                     0.0096
                    TCSX                     0.0081
                    TCUX                     0.0001
                   TCSRX2                    0.0270
                   TCSRV23                   0.0126




CONSEQUENCE MEASURE:
 EARLY FATALITIES


 BASE CASE :
  PEACH BOTTOM LLN (CRAC2)

 FRACTIONAL CONTRIBUTION OF EACH NONZERO BIN TO MEAN RISK
                  BIN                    CONTRIBUTION
          BAACAAGBDABCBBBBHHABBB            0.0002
          BAACACGBDAACBBBBHHABBB            0.0028
          BAACACGBDAACBDDBHHABBB            0.0019
          BAACACGBDABCBBBBHHABBB            0.0002
          BAACACGBDABCBDDBHHABBB            0.0001
          BAACACGBFAACCBBBHHABBB            0.0009
          BAACACGBFAACCDDBHHABBB            0.0001
          BAACACGBFABCCBBBHHABBB            0.0001
          BAACACGGDAACBABBDDABBB            0.0003
          BAACCCGBFAACCBBBHHABBB            0.0002
          BAACCCGGDAACBADBDEABBB            0.0001
          BABBACGCFAACCBBBHHABBB            0.0002
          BABBACGCFAACCBBBHHBBBB            0.0001
          BABBCCGGDAACBADBEGABBB            0.0001
          BACBAAGCFABCCBBBHHABBB            0.0002
          BACBAAGCFABCCDDBHHABBB            0.0001
          CAACAABGFDACBCCBACABAB            0.0001
          CAACAABGFDACBCCBADABAB            0.0002
          CAACAABGFDACBCCBAEABAB            0.0001
          CAACACBGDDACBABBADABAB            0.0001
          CAACACBGDDACBABBAEABAB            0.0001
          CAACACBGDDACBCCBAABAAB            0.0001
          CAACACBGDDACBCDBABBAAB            0.0001
          CAACACBGDDACBCDBACABAB            0.0001
          CAACACBGDDACBCDBADABAB            0.0007
          CAACACBGDDACBCDBAEABAB            0.0010
          CAACACBGDDACBCDBAFABAB            0.0002
          CAACACBGDDACBDDBADABAB            0.0001
          CAACACBGDDACBDDBAEABAB            0.0001
          CAACACBGFDACBCCBACABAB            0.0005
          CAACACBGFDACBCCBADABAB            0.0006
          CAACACBGFDACBCDBACABAB            0.0005
          CAACACBGFDACBCDBADABAB            0.0008
          CAACACBGFDACBCDBAEABAB            0.0003
          CAACCCBGDDACBABBADABAB            0.0001
          CAACCCBGDDACBABBAEABAB            0.0001
          CAACCCBGDDACBCDBADABAB            0.0003
          CAACCCBGDDACBCDBAEABAB            0.0003
          CAACCCBGFDACBCCBACABAB            0.0003
          CAACCCBGFDACBCCBADABAB            0.0002
          CAACCCBGFDACBCCBAEABAB            0.0001
          CAACCCBGFDACBCDBACABAB            0.0001
          CAACCCBGFDACBCDBADABAB            0.0001
          CAACCCBGFDACBCDBAEABAB            0.0001
          DAAAAAGBDABCBBBBHHABBB            0.0001
          DAAAAAGBDDACBBBBHHABBB            0.0012
          DAAAAAGBDDACBBBBHHBABB            0.0001
          DAAAAAGBDDACBDDBHHABBB            0.0003
          DAAAAAGBFABCCBBBHHABBB            0.0001
          DAAAAAGBFDACCBBBHHABBB            0.0016
          DAAAAAGBFDACCDDBHHABBB            0.0007
          DAAAAAGGDDACBBBBADABAB            0.0001
          DAAAAAGGDDACBBBBAEABAB            0.0001
          DAAAAAGGDDACBDDBAEABAB            0.0001
          DAAAACGBDABCBBBBHHABBB            0.0001
          DAAAACGBDDACBBBBHHABBB            0.0032
```

DAAAACGBFDACBBBBHHBABB	0.0001
DAAAACGBDDACBDDBHHABBB	0.0022
DAAAACGBFABCCBBBHHABBB	0.0001
DAAAACGBFDACBBBBHHABAB	0.0001
DAAAACGBFDACCBBBHHABBB	0.0027
DAAAACGBFDACCDDBHHABBB	0.0010
DAAAACGBFDACCDDBHHBABB	0.0001
DAAAACGGDDACBBBBADABAB	0.0005
DAAAACGGDDACBBBBAEABAB	0.0017
DAAAACGGDDACBDDBACABAB	0.0001
DAAAACGGDDACBDDBADABAB	0.0001
DAAAACGGDDACBDDBAEABAB	0.0007
DAAAACGGDDACBDDBAGABAB	0.0002
DAAACCGBDDACBBBBHHABBB	0.0005
DAAACCGBDDACBDDBHHABBB	0.0003
DAAACCGBFDACCBBBHHABBB	0.0004
DAAACCGBFDACCDDBHHABBB	0.0003
DAAACCGGDDACBBBBADABAB	0.0001
DAAACCGGDDACBBBBAEABAB	0.0001
DAAACCGGDDACBDDBADABAB	0.0001
DAAACCGGDDACBDDBAEABAB	0.0001
DABAAAGADABCBBBBHGABAB	0.0002
DABAAAGADABCBDDBHGABAB	0.0005
DABAAAGADDACBBBBHGABAB	0.0007
DABAAAGADDACBDDBHGABAB	0.0004
DABAACGADABCBBBBHGABAB	0.0016
DABAACGADABCBDDBHGABAB	0.0002
DABAACGADDACBBBBHGABAB	0.0063
DABAACGADDACBDDBHGABAB	0.0022
DACAAAGADABCCBBBHHABBB	0.0005
DACAAAGADABCCDDBHHABBB	0.0002
EBAACCFGFDBCBADBEHBBBB	0.0001
EBAACCGGDDBCBABBEGABBB	0.0008
EBAACCGGDDBCBABBEGBBBB	0.0005
EBAACCGGDDBCBABBEHABBB	0.0023
EBAACCGGDDBCBABBEHBBBB	0.0025
EBAACCGGDDBCBADBEHABBB	0.0017
EBAACCGGDDBCBADBEHBBBB	0.0018
EBACBBGEFCBCCABBFEABBA	0.0001
EBACBBGGDCBCBABBFBBABA	0.0070
EBACBBGGDCBCBABBFCBABA	0.0002
EBACBBGGDCBCBABBFDABBA	0.0006
EBACBBGGDCBCBABBFEABBA	0.0001
EBACBBGGDCBCBABBFFABBA	0.0001
EBACBCGGDCBCBABBFBBABA	0.0038
EBACBCGGDCBCBABBFCBABA	0.0002
EBACBCGGDCBCBABBFDABBA	0.0009
EBACBCGGDCBCBABBFEABBA	0.0001
EBACBCGGDCBCBABBFFABBA	0.0001
EBACBCGGDCBCBABBFFBBBA	0.0006
EBACBCGGDCBCBADBFBBABA	0.0044
EBACBCGGDCBCBADBFEABBA	0.0004
EBACBCGGDCBCBADBFFABBA	0.0004
EBACCCDEEDBCCADBFBBABB	0.0002
EBACCCDGFDBCBADBFBBABB	0.0043
EBACCCFGFDBBBADBFCBABB	0.0009
EBACCCFGFDBBBADBFEABBB	0.0001
EBACCCFGFDBCBABBFCBABB	0.0004
EBACCCFGFDBCBABBFEABBB	0.0047
EBACCCFGFDBCBACBFCBABB	0.0010
EBACCCFGFDBCBACBFEABBB	0.0001
EBACCCFGFDBCBADBFBBABB	0.0004
EBACCCFGFDBCBADBFCBABB	0.0141
EBACCCFGFDBCBADBFEABBB	0.0011
EBACCCFGFDBCBADBFEBBBB	0.0001
EBACCCGEFDBCCABBFEABBB	0.0002
EBACCCGEFDBCCADBFCBABB	0.0072
EBACCCGEFDBCCADBFEBBBB	0.0010
EBACCCGGDDBBBABBFABABB	0.0001
EBACCCGGDDBBBABBFBBABB	0.0002
EBACCCGGDDBBBABBFEABBB	0.0019
EBACCCGGDDBBBABBFFABBB	0.0014
EBACCCGGDDBBBABBFGABBB	0.0001
EBACCCGGDDBBBADBFABABB	0.0012
EBACCCGGDDBBBADBFCBABB	0.0014
EBACCCGGDDBBBADBFEABBB	0.0003
EBACCCGGDDBBBADBFFBBBB	0.0002
EBACCCGGDDBCBABBFABABB	0.0754
EBACCCGGDDBCBABBFBABAB	0.0003
EBACCCGGDDBCBABBFBBABB	0.2099
EBACCCGGDDBCBABBFCBABB	0.0418
EBACCCGGDDBCBABBFCBBBB	0.0034
EBACCCGGDDBCBABBFDABBB	0.0258
EBACCCGGDDBCBABBFDBBBB	0.0010
EBACCCGGDDBCBABBFEABBB	0.0407
EBACCCGGDDBCBABBFEBBBB	0.0180

EBACCCGGDDBCBABBFFABBB	0.0363
EBACCCGGDDBCBABBFFBBBB	0.0070
EBACCCGGDDBCBABBFGABBB	0.0089
EBACCCGGDDBCBADBFABABB	0.0429
EBACCCGGDDBCBADBFBBABB	0.1251
EBACCCGGDDBCBADBFCBABB	0.0043
EBACCCGGDDBCBADBFEABBB	0.0200
EBACCCGGDDBCBADBFEBBBB	0.0015
EBACCCGGDDBCBADBFFABBB	0.0110
EBACCCGGDDBCBADBFFBBBB	0.0154
EBACCCGGDDBCBADBFGABBB	0.0003
EBACCCGGEDBBBADBFEABBB	0.0001
EBACCCGGEDBCBABBFBBABB	0.0001
EBACCCGGEDBCBABBFCBABB	0.0131
EBACCCGGEDBCBABBFCBBBB	0.0025
EBACCCGGEDBCBABBFEABBB	0.0075
EBACCCGGEDBCBABBFEBBBB	0.0008
EBACCCGGEDBCBADBFCBABB	0.0127
EBACCCGGEDBCBADBFEABBB	0.0002
EBACCCGGEDBCBADBFEBBBB	0.0007
EBBBACGGDBBCBABBDGABBB	0.0001
EBBBACGGDBBCBABBEGABBB	0.0001
EBBBACGGDBBCBADBDGABBB	0.0001
EBBBACGGDBBCBADBEGABBB	0.0001
FCACBBGGDCBCBABBDBBABA	0.0001
FCACBBGGDCBCBABBDCBABA	0.0001
FCACBBGGDCBCBABBDEABBA	0.0001
FCACBBGGDCBCBABBEBBABA	0.0001
FCACBBGGDCBCBABBEEABBA	0.0001
FCACBCGGDCBCBABBDBBABA	0.0001
FCACBCGGDCBCBABBDCBABA	0.0001
FCACBCGGDCBCBABBDEABBA	0.0002
FCACBCGGDCBCBABBEBBABA	0.0001
FCACBCGGDCBCBABBEEABBA	0.0001
FCACBCGGDCBCBADBDCBABA	0.0002
FCACBCGGDCBCBADBDFABBA	0.0001
FCACBCGGDCBCBADBECBABA	0.0002
FCACBCGGDCBCBADBEEABBA	0.0001
FCACCCDGFDBBBADBEBBABB	0.0001
FCACCCDGFDBCBACBEBBABB	0.0002
FCACCCDGFDBCBADBDBBABB	0.0008
FCACCCDGFDBCBADBDCBABB	0.0003
FCACCCDGFDBCBADBDEABBB	0.0004
FCACCCDGFDBCBADBEBBABB	0.0023
FCACCCDGFDBCBADBECBABB	0.0003
FCACCCFGFDBCBABBGEABBB	0.0006
FCACCCFGFDBCBADBDFABBB	0.0001
FCACCCFGFDBCBADBEEABBB	0.0003
FCACCCFGFDBCBADBGBBABB	0.0001
FCACCCGBDDBCBABBHHABBB	0.0003
FCACCCGBDDBCBABBHHBABB	0.0001
FCACCCGBDDBCBDDBHHABBB	0.0018
FCACCCGBDDBCBDDBHHBABB	0.0012
FCACCCGBFDBCCDDBHHBABB	0.0001
FCACCCGDFDBCBADBDCBABB	0.0003
FCACCCGEFDBCCABBEEABBB	0.0001
FCACCCGEFDBCCADBEGABBB	0.0005
FCACCCGGDDBBBABBEABABB	0.0001
FCACCCGGDDBBBABBECBABB	0.0004
FCACCCGGDDBBBABBEEABBB	0.0025
FCACCCGGDDBBBADBEBBABB	0.0001
FCACCCGGDDBBBADBECBABB	0.0005
FCACCCGGDDBCBABBCABABB	0.0001
FCACCCGGDDBCBABBCBBABB	0.0019
FCACCCGGDDBCBABBDABABB	0.0013
FCACCCGGDDBCBABBDBBABB	0.0070
FCACCCGGDDBCBABBDCBABB	0.0036
FCACCCGGDDBCBABBDDABBB	0.0030
FCACCCGGDDBCBABBDEABBB	0.0077
FCACCCGGDDBCBABBDEBBBB	0.0005
FCACCCGGDDBCBABBDFABBB	0.0022
FCACCCGGDDBCBABBDFBBBB	0.0002
FCACCCGGDDBCBABBDGABBB	0.0052
FCACCCGGDDBCBABBEABABB	0.0032
FCACCCGGDDBCBABBEBBABB	0.0129
FCACCCGGDDBCBABBECBABB	0.0027
FCACCCGGDDBCBABBEDABBB	0.0025
FCACCCGGDDBCBABBEEABBB	0.0162
FCACCCGGDDBCBABBEEBBBB	0.0004
FCACCCGGDDBCBABBEFABBB	0.0015
FCACCCGGDDBCBABBEFBBBB	0.0006
FCACCCGGDDBCBABBEGABBB	0.0010
FCACCCGGDDBCBABBGABABB	0.0001
FCACCCGGDDBCBABBGBBABB	0.0016
FCACCCGGDDBCBABBGCBABB	0.0042
FCACCCGGDDBCBABBGEABBB	0.0002

FCACCCGGDDBCBACBEABABB	0.0001
FCACCCGGDDBCBADBDABABB	0.0018
FCACCCGGDDBCBADBDBBABB	0.0041
FCACCCGGDDBCBADBDCBABB	0.0057
FCACCCGGDDBCBADBDEABBB	0.0027
FCACCCGGDDBCBADBDEBBBB	0.0004
FCACCCGGDDBCBADBDFABBB	0.0015
FCACCCGGDDBCBADBDGABBB	0.0122
FCACCCGGDDBCBADBEABABB	0.0032
FCACCCGGDDBCBADBEBBABB	0.0020
FCACCCGGDDBCBADBECBABB	0.0093
FCACCCGGDDBCBADBEEABBB	0.0045
FCACCCGGDDBCBADBEEBBBB	0.0005
FCACCCGGDDBCBADBEFABBB	0.0012
FCACCCGGDDBCBADBEFBBBB	0.0001
FCACCCGGDDBCBADBGCBABB	0.0009
FCACCCGGDDBCBADBGEABBB	0.0008
FCACCCGGDDBCBDDBHABABB	0.0001
FCACCCGGEDBCBABBDEABBB	0.0002
FCACCCGGEDBCBABBEEABBB	0.0017
FCACCCGGEDBCBABBGEABBB	0.0005
FCACCCGGEDBCBADBCFABBB	0.0002
FCACCCGGEDBCBADBDCBABB	0.0002
FCBBAAGCDBBBBBBBHHABBB	0.0001
FCBBAAGCDBBCBBBBHHABBB	0.0002
FCBBAAGCFBBCCDDBHHABBB	0.0001
FCBBACGCDBBBBBBBHHABBB	0.0002
FCBBACGCDBBCBBBBHHABBB	0.0003
FCBBACGCDBBCBBBBHHBBBB	0.0001
FCBBACGCFBBBCDDBHHABBB	0.0001
FCBBACGCFBBCCDDBHHABBB	0.0002
FCBBACGGDBBCBABBEGABBB	0.0001
FCBBACGGDBBCBADBEGABBB	0.0001
FCCBAAGCFBBBCBBBHHABBB	0.0003
FCCBAAGCFBBBCDDBHHABBB	0.0001
FCCBAAGCFBBCCBBBHHABBB	0.0008
FCCBAAGCFBBCCDDBHHABBB	0.0008

260

```
CONSEQUENCE MEASURE:
 EARLY FATALITIES


 BASE CASE :
  PEACH BOTTOM LLH (CRAC2)

 FRACTIONAL CONTRIBUTIONS OF EACH RELEASE TO MEAN RISK
                    RELEASE                CONTRIBUTION
                    PCH  1D                   0.0000
                    PCH  2D                   0.0000
                    PCH  3D                   0.0008
                    PCH  4D                   0.0016
                    PCH  5D                   0.0049
                    PCH  6D                   0.1096
                    PCH  7D                   0.2384
                    PCH  8D                   0.2736
                    PCH  9D                   0.3233
                    PCH 10D                   0.0000
                    PCH 11D                   0.0000
                    PCH 12D                   0.0000
                    PCH 13D                   0.0000
                    PCH 14D                   0.0000
                    PCH 15D                   0.0000
                    PCH 16D                   0.0008
                    PCH 17D                   0.0000
                    PCH 18D                   0.0000
                    PCH 19D                   0.0000
                    PCH 20D                   0.0000
                    PCH 21D                   0.0000
                    PCH 22D                   0.0000
                    PCH 23D                   0.0000
                    PCH 24D                   0.0002
                    PCH 25D                   0.0000
                    PCH 26D                   0.0004
                    PCH 27D                   0.0034
                    PCH 28D                   0.0024
                    PCH 29D                   0.0066
                    PCH 30D                   0.0015
                    PCH 31D                   0.0009
                    PCH 32D                   0.0015
                    PCH 33D                   0.0001
                    PCH 34D                   0.0016
                    PCH 35D                   0.0000
                    PCH 36D                   0.0015
                    PCH 37D                   0.0008
                    PCH 38D                   0.0009
                    PCH 39D                   0.0033
                    PCH 40D                   0.0000
                    PCH 41D                   0.0015
                    PCH 42D                   0.0026
                    PCH 43D                   0.0013
                    PCH 44D                   0.0007
                    PCH 45D                   0.0028
                    PCH 46D                   0.0012
                    PCH 47D                   0.0011
                    PCH 48D                   0.0069
                    PCH 49D                   0.0000
                    PCH 50D                   0.0020
                    PCH 51D                   0.0013
                    PCH 52D                   0.0002
                    PCH 53D                   0.0001
                    PCH 54D                   0.0000
```

```
CONSEQUENCE MEASURE:
  EARLY FATALITIES

  SENSITIVITY OF RISK TO ISSUES
  DISTRIBUTION OF RISK AT EACH LEVEL OF EACH ISSUE
  BASE CASE :
   PEACH BOTTOM LLH (CRAC2)

 GP ISS LVL NUM      5%          50%          MEAN         95%        R**2     F   DF       SIGNIF.
  1   1   1  15  0.1352E-07  0.2582E-06  0.1099E-05  0.7134E-05    0.02     1.1(  3,146)    0.36NS
          3  60  0.5867E-08  0.3657E-06  0.1473E-05  0.6158E-05
          2  60  0.9072E-08  0.4046E-06  0.2028E-05  0.6301E-05
          4  15  0.5211E-07  0.7987E-06  0.2483E-05  0.1414E-04
  1   2   1  15  0.8788E-08  0.1540E-06  0.3380E-06  0.1250E-05    0.17    10.2(  3,146)    0.00**
          2  60  0.6591E-08  0.3657E-06  0.5056E-06  0.1476E-05
          3  60  0.8810E-08  0.7676E-06  0.1176E-05  0.4384E-05
          4  15  0.1244E-06  0.7622E-05  0.1052E-04  0.3577E-04
  1   3   1  15  0.1229E-07  0.1150E-06  0.5754E-06  0.2895E-05    0.03     1.3(  3,146)    0.27NS
          4  15  0.5288E-07  0.7739E-06  0.1230E-05  0.5200E-05
          2  60  0.6057E-08  0.4050E-06  0.1837E-05  0.4510E-05
          3  60  0.1016E-07  0.4159E-06  0.2108E-05  0.1271E-04
  1   4   2  62  0.9925E-08  0.4152E-06  0.1515E-05  0.9696E-05    0.00     0.1(  1,148)    0.77NS
          1  88  0.7641E-08  0.4046E-06  0.1930E-05  0.6335E-05
  1   5   1  15  0.5717E-08  0.2768E-07  0.1443E-05  0.1049E-04    0.07     3.4(  3,146)    0.02 *
          3  60  0.7892E-08  0.7303E-06  0.1736E-05  0.6345E-05
          2  60  0.2495E-07  0.3330E-06  0.1823E-05  0.6158E-05
          4  15  0.1326E-07  0.4027E-06  0.1900E-05  0.1048E-04
  2   1   1  15  0.9320E-08  0.5726E-06  0.9815E-06  0.4483E-05    0.00     0.0(  3,146)    0.99NS
          2  60  0.8897E-08  0.4123E-06  0.1366E-05  0.5686E-05
          3  60  0.9072E-08  0.3949E-06  0.2166E-05  0.1136E-04
          4  15  0.9562E-08  0.4122E-06  0.2477E-05  0.1629E-04
  2   2   3  60  0.6493E-08  0.3792E-06  0.1102E-05  0.5191E-05    0.01     0.5(  3,146)    0.65NS
          2  60  0.1211E-07  0.3860E-06  0.1733E-05  0.8221E-05
          1  15  0.8788E-08  0.4170E-06  0.1933E-05  0.1128E-04
          4  15  0.2412E-08  0.4865E-06  0.4309E-05  0.3049E-04
  2   3   3  60  0.6762E-08  0.1949E-06  0.1387E-05  0.8221E-05    0.02     0.8(  3,146)    0.47NS
          1  15  0.7221E-06  0.3555E-06  0.1615E-05  0.1124E-04
          2  60  0.1645E-07  0.5853E-06  0.1727E-05  0.6158E-05
          4  15  0.1229E-07  0.4865E-06  0.3514E-05  0.2010E-04
  2   4   4  15  0.9003E-08  0.1953E-06  0.6245E-06  0.2784E-05    0.01     0.3(  3,146)    0.86NS
          1  15  0.1768E-08  0.3196E-06  0.9481E-06  0.3772E-05
          2  60  0.1739E-07  0.4152E-06  0.1706E-05  0.9193E-05
          3  60  0.8218E-08  0.4447E-06  0.2296E-05  0.1136E-04
  2   5   2  24  0.1255E-07  0.2856E-06  0.1187E-05  0.3744E-05    0.00     0.2(  1,148)    0.65NS
          1 126  0.7050E-08  0.4176E-06  0.1867E-05  0.7856E-05
  2   6   4   9  0.5918E-08  0.4027E-06  0.4675E-06  0.1278E-05    0.04     0.7(  8,141)    0.72NS
          1   2************************  0.4743E-06************
          2  11  0.7038E-07  0.1727E-06  0.5746E-06  0.1737E-05
          8  16  0.2769E-08  0.2788E-06  0.5839E-06  0.2666E-05
          7  20  0.1611E-07  0.2498E-06  0.8435E-06  0.3172E-05
          9  12  0.6805E-08  0.5600E-06  0.1830E-05  0.8169E-05
          6  38  0.7421E-08  0.3810E-06  0.2280E-05  0.1502E-04
          3  20  0.9203E-08  0.1059E-05  0.2338E-05  0.1064E-04
          5  22  0.6322E-08  0.3846E-06  0.3213E-05  0.1902E-04
  2   7   2  94  0.1466E-07  0.4022E-06  0.1295E-05  0.5935E-05    0.01     0.5(  2,147)    0.62NS
          3  51  0.5660E-08  0.4170E-06  0.2420E-05  0.1465E-04
          1   5  0.2911E-07  0.3568E-05  0.3698E-05  0.1109E-04
  2   8   1  15  0.1804E-08  0.7768E-06  0.7979E-06  0.1806E-05    0.00     0.0(  1,148)    1.00NS
          2 135  0.1076E-07  0.4065E-06  0.1865E-05  0.8538E-05
  2   9   2  75  0.6627E-08  0.3919E-06  0.1491E-05  0.6182E-05    0.01     1.3(  1,148)    0.26NS
          1  75  0.1076E-07  0.4607E-06  0.2026E-05  0.1049E-04
  2  10   2  75  0.6013E-08  0.3571E-06  0.9367E-06  0.3678E-05    0.01     2.1(  1,148)    0.15NS
          1  75  0.2354E-07  0.4607E-06  0.2580E-05  0.1514E-04
  2  11   4   4************************  0.5634E-06************    0.05     2.8(  3,146)    0.04 *
          1  16  0.3516E-08  0.4222E-07  0.7295E-06  0.3942E-05
          2  80  0.1924E-07  0.3761E-06  0.1550E-05  0.9916E-05
          3  50  0.1071E-07  0.7303E-06  0.2516E-05  0.7622E-05
  2  12   2  45  0.5851E-08  0.2582E-06  0.1198E-05  0.4617E-05    0.05     2.1(  4,145)    0.09NS
          3  38  0.1172E-07  0.3757E-06  0.1269E-05  0.6527E-05
          4  22  0.7900E-08  0.5905E-06  0.1564E-05  0.6263E-05
          1  30  0.1860E-07  0.4358E-06  0.2786E-05  0.1109E-04
          5  15  0.8899E-08  0.1359E-05  0.2908E-05  0.1409E-04
  2  13   1  60  0.2107E-07  0.4881E-06  0.1521E-05  0.6877E-05    0.03     2.3(  2,147)    0.11NS
          2  75  0.6531E-08  0.3084E-06  0.1568E-05  0.5862E-05
          3  15  0.4250E-08  0.6089E-06  0.3661E-05  0.2034E-04
  2  14   2  75  0.5842E-08  0.1513E-06  0.8612E-06  0.2922E-05    0.25    48.4(  1,148)    0.00**
          1  75  0.2571E-07  0.1142E-05  0.2655E-05  0.1049E-04
  2  15   2  90  0.1071E-07  0.4094E-06  0.1736E-05  0.8867E-05    0.00     0.1(  1,148)    0.81NS
          1  60  0.6963E-08  0.4120E-06  0.1792E-05  0.3808E-05
  2  16   2  75  0.6013E-08  0.4065E-06  0.1201E-05  0.5862E-05    0.00     0.6(  1,148)    0.42NS
          1  75  0.1514E-07  0.4182E-06  0.2316E-05  0.1360E-04
  2  17   2 120  0.6762E-08  0.3551E-06  0.1424E-05  0.6878E-05    0.05     8.5(  1,148)    0.00**
          1  30  0.5228E-07  0.1084E-05  0.3095E-05  0.1456E-04
  3   1   4   3************************  0.6446E-06************    0.01     0.7(  3,146)    0.54NS
          2  74  0.7334E-08  0.3883E-06  0.1142E-05  0.5935E-05
          3  39  0.1642E-07  0.3571E-06  0.1903E-05  0.1119E-04
          1  34  0.7938E-08  0.5413E-06  0.3032E-05  0.1847E-04
 3   2    4  15  0.8456E-08  0.4027E-06  0.7789E-06  0.3207E-05   0.01    0.6(  3,146)   0.60NS
          3  51  0.1121E-07  0.4065E-06  0.8627E-06  0.3466E-05
          1  29  0.5708E-08  0.1946E-06  0.1223E-05  0.5420E-05
          2  55  0.7200E-08  0.4607E-06  0.3138E-05  0.1767E-04
 3   3    1  14  0.2703E-07  0.3367E-06  0.4531E-06  0.1151E-05   0.02    0.6(  4,145)   0.69NS
          5   7  0.7686E-08  0.4122E-06  0.7886E-06  0.3463E-05
          4  35  0.3987E-08  0.3979E-06  0.1558E-05  0.8110E-05
          2  58  0.6071E-08  0.6274E-06  0.2068E-05  0.1124E-04
          3  36  0.4261E-07  0.3741E-06  0.2151E-05  0.7891E-05
 3   4    5   5  0.2793E-07  0.2312E-06  0.4367E-06  0.1359E-05   0.01    0.5(  4,145)   0.76NS
          1  15  0.9625E-07  0.3979E-06  0.6494E-06  0.1642E-05
          3  30  0.6308E-08  0.4734E-06  0.1560E-05  0.8867E-05
          2  76  0.6289E-08  0.3973E-06  0.1714E-05  0.9908E-05
          4  24  0.2142E-07  0.7080E-06  0.3114E-05  0.1095E-04
 3   5    1   4************************  0.5309E-06************   0.06    2.3(  4,145)   0.06NS
          3  46  0.1088E-07  0.3065E-06  0.8622E-06  0.3469E-05
          2  35  0.7263E-08  0.1453E-06  0.1334E-05  0.1010E-04
          4  50  0.5817E-08  0.4296E-06  0.2683E-05  0.1456E-04
          5  15  0.1872E-06  0.6465E-06  0.2740E-05  0.1548E-04
 3   6    1   4************************  0.3861E-06************   0.02    0.9(  3,146)   0.43NS
          4  23  0.1568E-07  0.8369E-06  0.1367E-05  0.5447E-05
          3  76  0.6693E-08  0.4117E-06  0.1803E-05  0.1199E-04
          2  47  0.1562E-07  0.1953E-06  0.1995E-05  0.5642E-05
 3   7    1  18  0.6418E-08  0.9312E-07  0.7422E-06  0.4546E-05   0.05    2.4(  3,146)   0.07NS
          2  62  0.6107E-08  0.4003E-06  0.1423E-05  0.8097E-05
          3  55  0.1352E-07  0.4896E-06  0.1770E-05  0.5263E-05
          4  15  0.7874E-07  0.4343E-06  0.4320E-05  0.3049E-04
 3   8    1  25  0.6181E-08  0.5540E-07  0.4427E-06  0.1682E-05   0.14    7.7(  3,146)   0.00**
          2  58  0.5757E-08  0.2359E-06  0.1296E-05  0.6168E-05
          4  15  0.1578E-06  0.7004E-06  0.2396E-05  0.1239E-04
          3  52  0.3647E-07  0.7611E-06  0.2722E-05  0.1452E-04
 3   9    1  12  0.1424E-08  0.2094E-06  0.5513E-06  0.1525E-05   0.01    0.7(  3,146)   0.53NS
          2  27  0.5792E-08  0.4065E-06  0.8987E-06  0.5220E-05
          4  54  0.6562E-08  0.4104E-06  0.1222E-05  0.3834E-05
          3  57  0.2134E-07  0.4343E-06  0.2927E-05  0.1734E-04
 3  10    1   7  0.2869E-08  0.2709E-06  0.5778E-06  0.1931E-05   0.01    0.7(  3,146)   0.55NS
          2  49  0.7159E-08  0.4122E-06  0.1183E-05  0.5175E-05
          3  73  0.1879E-07  0.4065E-06  0.1743E-05  0.7373E-05
          4  21  0.1872E-07  0.5726E-06  0.3550E-05  0.1960E-04
 3  11    1  75  0.6226E-08  0.3979E-06  0.1697E-05  0.4822E-05   0.00    0.6(  1,148)   0.42NS
          2  75  0.1158E-07  0.4170E-06  0.1820E-05  0.1049E-04
 3  12    2  50  0.5652E-08  0.3318E-06  0.7261E-06  0.1991E-05   0.03    2.1(  2,147)   0.12NS
          3  50  0.7686E-08  0.3065E-06  0.1714E-05  0.8867E-05
          1  50  0.1860E-07  0.5478E-06  0.2835E-05  0.1533E-04
 3  13    1  38  0.6827E-08  0.2907E-06  0.9522E-06  0.4835E-05   0.02    1.0(  3,146)   0.38NS
          4  37  0.1159E-07  0.4607E-06  0.9850E-06  0.3783E-05
          3  38  0.9382E-08  0.4216E-06  0.2224E-05  0.1502E-04
          2  37  0.5652E-08  0.4896E-06  0.2881E-05  0.1552E-04
 3  14    3  30  0.6308E-08  0.4123E-06  0.8896E-06  0.5281E-05   0.01    0.4(  4,145)   0.80NS
          4  30  0.5511E-07  0.4003E-06  0.1126E-05  0.3715E-05
          5  30  0.7686E-08  0.2296E-06  0.1925E-05  0.1109E-04
          2  30  0.1071E-07  0.3850E-06  0.1982E-05  0.1456E-04
          1  30  0.5817E-08  0.6036E-06  0.2869E-05  0.2099E-04
NS=NOT SIGNIFICANT, *=SIGNIFICANT (P<.05), **=SIGNIFICANT (P<.01)
```

```
     CONSEQUENCE MEASURE:  EARLY FATALITIES

 0     ISSUE GROUP =   1    ISSUE =   1   SLC FAILURE TO ACTUATE

       LEVEL 1 NO.<MED.=  9 NO. EXP.=  7      NO.>=MED.=  6 NO. EXP.=  8   CHI-SQ.=   1.1 DF= 1 SIG.= 0.301
       LEVEL 2 NO.<MED.= 30 NO. EXP.= 30      NO.>=MED.= 30 NO. EXP.= 30   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
       LEVEL 3 NO.<MED.= 31 NO. EXP.= 30      NO.>=MED.= 29 NO. EXP.= 30   CHI-SQ.=   0.1 DF= 1 SIG.= 0.796
       LEVEL 4 NO.<MED.=  4 NO. EXP.=  7      NO.>=MED.= 11 NO. EXP.=  8   CHI-SQ.=   2.4 DF= 1 SIG.= 0.120
       OVERALL CHI-SQ=   3.5 DF=  7  SIG.= 0.830

 0     ISSUE GROUP =   1    ISSUE =   2   DC COMMON MODE

       LEVEL 1 NO.<MED.= 11 NO. EXP.=  7      NO.>=MED.=  4 NO. EXP.=  8   CHI-SQ.=   4.3 DF= 1 SIG.= 0.038
       LEVEL 2 NO.<MED.= 33 NO. EXP.= 30      NO.>=MED.= 27 NO. EXP.= 30   CHI-SQ.=   0.6 DF= 1 SIG.= 0.439
       LEVEL 3 NO.<MED.= 27 NO. EXP.= 30      NO.>=MED.= 33 NO. EXP.= 30   CHI-SQ.=   0.6 DF= 1 SIG.= 0.439
       LEVEL 4 NO.<MED.=  3 NO. EXP.=  7      NO.>=MED.= 12 NO. EXP.=  8   CHI-SQ.=   4.3 DF= 1 SIG.= 0.038
       OVERALL CHI-SQ=   9.8 DF=  7  SIG.= 0.202

 0     ISSUE GROUP =   1    ISSUE =   3   FAILURE TO VENT

       LEVEL 1 NO.<MED.=  9 NO. EXP.=  7      NO.>=MED.=  6 NO. EXP.=  8   CHI-SQ.=   1.1 DF= 1 SIG.= 0.301
       LEVEL 2 NO.<MED.= 30 NO. EXP.= 30      NO.>=MED.= 30 NO. EXP.= 30   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
       LEVEL 3 NO.<MED.= 30 NO. EXP.= 30      NO.>=MED.= 30 NO. EXP.= 30   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
       LEVEL 4 NO.<MED.=  5 NO. EXP.=  7      NO.>=MED.= 10 NO. EXP.=  8   CHI-SQ.=   1.1 DF= 1 SIG.= 0.301
       OVERALL CHI-SQ=   2.1 DF=  7  SIG.= 0.951

 0     ISSUE GROUP =   1    ISSUE =   4   SW MOD A VS. MOD B

       LEVEL 1 NO.<MED.= 44 NO. EXP.= 44      NO.>=MED.= 44 NO. EXP.= 44   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
       LEVEL 2 NO.<MED.= 30 NO. EXP.= 31      NO.>=MED.= 32 NO. EXP.= 31   CHI-SQ.=   0.1 DF= 1 SIG.= 0.799
       OVERALL CHI-SQ=   0.1 DF=  3  SIG.= 0.996

 0     ISSUE GROUP =   1    ISSUE =   5   POWER RECOVERY

       LEVEL 1 NO.<MED.= 11 NO. EXP.=  7      NO.>=MED.=  4 NO. EXP.=  8   CHI-SQ.=   4.3 DF= 1 SIG.= 0.038
       LEVEL 2 NO.<MED.= 32 NO. EXP.= 30      NO.>=MED.= 28 NO. EXP.= 30   CHI-SQ.=   0.3 DF= 1 SIG.= 0.606
       LEVEL 3 NO.<MED.= 23 NO. EXP.= 30      NO.>=MED.= 37 NO. EXP.= 30   CHI-SQ.=   3.3 DF= 1 SIG.= 0.071
       LEVEL 4 NO.<MED.=  8 NO. EXP.=  7      NO.>=MED.=  7 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
       OVERALL CHI-SQ=   8.1 DF=  7  SIG.= 0.325

 0     ISSUE GROUP =   2    ISSUE =   1   PROB. OF STUCK OPEN VAC. BRKR.

       LEVEL 1 NO.<MED.=  7 NO. EXP.=  7      NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
       LEVEL 2 NO.<MED.= 29 NO. EXP.= 30      NO.>=MED.= 31 NO. EXP.= 30   CHI-SQ.=   0.1 DF= 1 SIG.= 0.796
       LEVEL 3 NO.<MED.= 31 NO. EXP.= 30      NO.>=MED.= 29 NO. EXP.= 30   CHI-SQ.=   0.1 DF= 1 SIG.= 0.796
       LEVEL 4 NO.<MED.=  7 NO. EXP.=  7      NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
       OVERALL CHI-SQ=   0.1 DF=  7  SIG.= 1.000

 0     ISSUE GROUP =   2    ISSUE =   2   HPSW-SPRAY

       LEVEL 1 NO.<MED.=  6 NO. EXP.=  7      NO.>=MED.=  9 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
     LEVEL 2 NO.<MED.= 31 NO. EXP.= 30     NO.>=MED.= 29 NO. EXP.= 30   CHI-SQ.=   0.1 DF= 1 SIG.= 0.796
     LEVEL 3 NO.<MED.= 31 NO. EXP.= 30     NO.>=MED.= 29 NO. EXP.= 30   CHI-SQ.=   0.1 DF= 1 SIG.= 0.796
     LEVEL 4 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
     OVERALL CHI-SQ=   0.7 DF=  7  SIG.= 0.999

0    ISSUE GROUP =   2   ISSUE =   3   VENT-SBO-NACR

     LEVEL 1 NO.<MED.=  8 NO. EXP.=  7     NO.>=MED.=  7 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
     LEVEL 2 NO.<MED.= 24 NO. EXP.= 30     NO.>=MED.= 36 NO. EXP.= 30   CHI-SQ.=   2.4 DF= 1 SIG.= 0.121
     LEVEL 3 NO.<MED.= 35 NO. EXP.= 30     NO.>=MED.= 25 NO. EXP.= 30   CHI-SQ.=   1.7 DF= 1 SIG.= 0.197
     LEVEL 4 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   4.3 DF=  7  SIG.= 0.741

0    ISSUE GROUP =   2   ISSUE =   4   VENT-SBO-ACR

     LEVEL 1 NO.<MED.=  8 NO. EXP.=  7     NO.>=MED.=  7 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
     LEVEL 2 NO.<MED.= 29 NO. EXP.= 30     NO.>=MED.= 31 NO. EXP.= 30   CHI-SQ.=   0.1 DF= 1 SIG.= 0.796
     LEVEL 3 NO.<MED.= 29 NO. EXP.= 30     NO.>=MED.= 31 NO. EXP.= 30   CHI-SQ.=   0.1 DF= 1 SIG.= 0.796
     LEVEL 4 NO.<MED.=  8 NO. EXP.=  7     NO.>=MED.=  7 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
     OVERALL CHI-SQ=   0.7 DF=  7  SIG.= 0.999

0    ISSUE GROUP =   2   ISSUE =   5   SP BYPASS, SMALL/LARGE

     LEVEL 1 NO.<MED.= 60 NO. EXP.= 63     NO.>=MED.= 66 NO. EXP.= 63   CHI-SQ.=   0.3 DF= 1 SIG.= 0.593
     LEVEL 2 NO.<MED.= 14 NO. EXP.= 12     NO.>=MED.= 10 NO. EXP.= 12   CHI-SQ.=   0.7 DF= 1 SIG.= 0.414
     OVERALL CHI-SQ=   1.0 DF=  3  SIG.= 0.813

0    ISSUE GROUP =   2   ISSUE =   6   CONT FAILURE PRESS. (T<500F B VB)

     LEVEL 1 NO.<MED.=  1 NO. EXP.=  1     NO.>=MED.=  1 NO. EXP.=  1   TEST CANNOT BE RUN; EXP. NO. < 3
     LEVEL 2 NO.<MED.=  6 NO. EXP.=  5     NO.>=MED.=  5 NO. EXP.=  6   CHI-SQ.=   0.4 DF= 1 SIG.= 0.545
     LEVEL 3 NO.<MED.=  6 NO. EXP.= 10     NO.>=MED.= 14 NO. EXP.= 10   CHI-SQ.=   3.2 DF= 1 SIG.= 0.074
     LEVEL 4 NO.<MED.=  5 NO. EXP.=  4     NO.>=MED.=  4 NO. EXP.=  5   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 5 NO.<MED.= 11 NO. EXP.= 11     NO.>=MED.= 11 NO. EXP.= 11   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 6 NO.<MED.= 19 NO. EXP.= 19     NO.>=MED.= 19 NO. EXP.= 19   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 7 NO.<MED.= 11 NO. EXP.= 10     NO.>=MED.=  9 NO. EXP.= 10   CHI-SQ.=   0.2 DF= 1 SIG.= 0.655
     LEVEL 8 NO.<MED.= 10 NO. EXP.=  8     NO.>=MED.=  6 NO. EXP.=  8   CHI-SQ.=   1.0 DF= 1 SIG.= 0.317
     LEVEL 9 NO.<MED.=  5 NO. EXP.=  6     NO.>=MED.=  7 NO. EXP.=  6   CHI-SQ.=   0.3 DF= 1 SIG.= 0.564
     OVERALL CHI-SQ=   5.1 DF= 15  SIG.= 0.991

0    ISSUE GROUP =   2   ISSUE =   7   LATE FAILURE LOCATION (800-1200 A VB)

     LEVEL 1 NO.<MED.=  2 NO. EXP.=  2     NO.>=MED.=  3 NO. EXP.=  3   TEST CANNOT BE RUN; EXP. NO. < 3
     LEVEL 2 NO.<MED.= 47 NO. EXP.= 47     NO.>=MED.= 47 NO. EXP.= 47   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 3 NO.<MED.= 25 NO. EXP.= 25     NO.>=MED.= 26 NO. EXP.= 26   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   0.0 DF=  3  SIG.= 1.000

0    ISSUE GROUP =   2   ISSUE =   8   CONT FAILURE SIZE, RAPID PRESS.
```

BEST COPY AVAILABLE

265

```
     LEVEL 1 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 2 NO.<MED.= 67 NO. EXP.= 67     NO.>=MED.= 68 NO. EXP.= 68   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   0.0 DF=  3  SIG.= 1.000

0    ISSUE GROUP =   2   ISSUE =   5   CONT FAILURE SIZE, SLOW PRESS.

     LEVEL 1 NO.<MED.= 35 NO. EXP.= 37     NO.>=MED.= 40 NO. EXP.= 38   CHI-SQ.=   0.2 DF= 1 SIG.= 0.644
     LEVEL 2 NO.<MED.= 39 NO. EXP.= 37     NO.>=MED.= 36 NO. EXP.= 38   CHI-SQ.=   0.2 DF= 1 SIG.= 0.644
     OVERALL CHI-SQ=   0.4 DF=  3  SIG.= 0.935

0    ISSUE GROUP =   2   ISSUE =  10   VB MODE, HIGH-P FLOW MELT

     LEVEL 1 NO.<MED.= 35 NO. EXP.= 37     NO.>=MED.= 40 NO. EXP.= 38   CHI-SQ.=   0.2 DF= 1 SIG.= 0.644
     LEVEL 2 NO.<MED.= 39 NO. EXP.= 37     NO.>=MED.= 36 NO. EXP.= 38   CHI-SQ.=   0.2 DF= 1 SIG.= 0.644
     OVERALL CHI-SQ=   0.4 DF=  3  SIG.= 0.935

0    ISSUE GROUP =   2   ISSUE =  11   CONT PRESS. BEFORE VB, LONG TERM TB

     LEVEL 1 NO.<MED.= 11 NO. EXP.=  8     NO.>=MED.=  5 NO. EXP.=  8   CHI-SQ.=   2.3 DF= 1 SIG.= 0.134
     LEVEL 2 NO.<MED.= 42 NO. EXP.= 40     NO.>=MED.= 38 NO. EXP.= 40   CHI-SQ.=   0.2 DF= 1 SIG.= 0.655
     LEVEL 3 NO.<MED.= 18 NO. EXP.= 25     NO.>=MED.= 32 NO. EXP.= 25   CHI-SQ.=   3.9 DF= 1 SIG.= 0.048
     LEVEL 4 NO.<MED.=  3 NO. EXP.=  2     NO.>=MED.=  1 NO. EXP.=  2   TEST CANNOT BE RUN; EXP. NO. < 3
     OVERALL CHI-SQ=   6.4 DF=  5  SIG.= 0.272

0    ISSUE GROUP =   2   ISSUE =  12   PRESSURE RISE AT VB

     LEVEL 1 NO.<MED.= 14 NO. EXP.= 15     NO.>=MED.= 16 NO. EXP.= 15   CHI-SQ.=   0.1 DF= 1 SIG.= 0.715
     LEVEL 2 NO.<MED.= 26 NO. EXP.= 22     NO.>=MED.= 19 NO. EXP.= 23   CHI-SQ.=   1.4 DF= 1 SIG.= 0.233
     LEVEL 3 NO.<MED.= 21 NO. EXP.= 19     NO.>=MED.= 17 NO. EXP.= 19   CHI-SQ.=   0.4 DF= 1 SIG.= 0.516
     LEVEL 4 NO.<MED.=  9 NO. EXP.= 11     NO.>=MED.= 13 NO. EXP.= 11   CHI-SQ.=   0.7 DF= 1 SIG.= 0.394
     LEVEL 5 NO.<MED.=  4 NO. EXP.=  7     NO.>=MED.= 11 NO. EXP.=  8   CHI-SQ.=   2.4 DF= 1 SIG.= 0.120
     OVERALL CHI-SQ=   5.1 DF=  9  SIG.= 0.824

0    ISSUE GROUP =   2   ISSUE =  13   DELTA P DUE TO SUMP WATER INTERACT.

     LEVEL 1 NO.<MED.= 26 NO. EXP.= 30     NO.>=MED.= 34 NO. EXP.= 30   CHI-SQ.=   1.1 DF= 1 SIG.= 0.302
     LEVEL 2 NO.<MED.= 42 NO. EXP.= 37     NO.>=MED.= 33 NO. EXP.= 38   CHI-SQ.=   1.3 DF= 1 SIG.= 0.248
     LEVEL 3 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
     OVERALL CHI-SQ=   2.7 DF=  5  SIG.= 0.751

0    ISSUE GROUP =   2   ISSUE =  14   PROB OF DRY DW MELT THROUGH

     LEVEL 1 NO.<MED.= 17 NO. EXP.= 37     NO.>=MED.= 58 NO. EXP.= 38   CHI-SQ.=  21.3 DF= 1 SIG.= 0.000
     LEVEL 2 NO.<MED.= 57 NO. EXP.= 37     NO.>=MED.= 18 NO. EXP.= 38   CHI-SQ.=  21.3 DF= 1 SIG.= 0.000
     OVERALL CHI-SQ=  42.7 DF=  3  SIG.= 0.000

0    ISSUE GROUP =   2   ISSUE =  15   PROB OF WET DW MELT THROUGH

     LEVEL 1 NO.<MED.= 30 NO. EXP.= 30     NO.>=MED.= 30 NO. EXP.= 30   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 2 NO.<MED.= 44 NO. EXP.= 45     NO.>=MED.= 46 NO. EXP.= 45   CHI-SQ.=   0.0 DF= 1 SIG.= 0.833
     OVERALL CHI-SQ=   0.0 DF=  3  SIG.= 0.998

0    ISSUE GROUP =   2   ISSUE =  16   PROB OF DW M-THRU W/HI-P MELT EJECT

     LEVEL 1 NO.<MED.= 37 NO. EXP.= 37     NO.>=MED.= 38 NO. EXP.= 38   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 2 NO.<MED.= 37 NO. EXP.= 37     NO.>=MED.= 38 NO. EXP.= 38   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   0.0 DF=  3  SIG.= 1.000

0    ISSUE GROUP =   2   ISSUE =  17   PROB OF H2 BURNS IN RB LEADING TO BP

     LEVEL 1 NO.<MED.=  8 NO. EXP.= 15     NO.>=MED.= 22 NO. EXP.= 15   CHI-SQ.=   6.5 DF= 1 SIG.= 0.011
     LEVEL 2 NO.<MED.= 66 NO. EXP.= 60     NO.>=MED.= 54 NO. EXP.= 60   CHI-SQ.=   1.2 DF= 1 SIG.= 0.273
     OVERALL CHI-SQ=   7.7 DF=  3  SIG.= 0.052

0    ISSUE GROUP =   3   ISSUE =   1   IN-VES RELEASE FROM FUEL

     LEVEL 1 NO.<MED.= 14 NO. EXP.= 17     NO.>=MED.= 20 NO. EXP.= 17   CHI-SQ.=   1.1 DF= 1 SIG.= 0.303
     LEVEL 2 NO.<MED.= 38 NO. EXP.= 37     NO.>=MED.= 36 NO. EXP.= 37   CHI-SQ.=   0.1 DF= 1 SIG.= 0.816
     LEVEL 3 NO.<MED.= 21 NO. EXP.= 19     NO.>=MED.= 18 NO. EXP.= 20   CHI-SQ.=   0.4 DF= 1 SIG.= 0.522
     LEVEL 4 NO.<MED.=  1 NO. EXP.=  1     NO.>=MED.=  2 NO. EXP.=  2  TEST CANNOT BE RUN; EXP. NO. < 3
     OVERALL CHI-SQ=   1.5 DF=  5  SIG.= 0.910

0    ISSUE GROUP =   3   ISSUE =   2   CSI DECOMP

     LEVEL 1 NO.<MED.= 16 NO. EXP.= 14     NO.>=MED.= 13 NO. EXP.= 15   CHI-SQ.=   0.6 DF= 1 SIG.= 0.457
     LEVEL 2 NO.<MED.= 25 NO. EXP.= 27     NO.>=MED.= 30 NO. EXP.= 28   CHI-SQ.=   0.3 DF= 1 SIG.= 0.590
     LEVEL 3 NO.<MED.= 25 NO. EXP.= 25     NO.>=MED.= 26 NO. EXP.= 26   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 4 NO.<MED.=  8 NO. EXP.=  7     NO.>=MED.=  7 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
     OVERALL CHI-SQ=   1.1 DF=  7  SIG.= 0.993

0    ISSUE GROUP =   3   ISSUE =   3   FRAC IN-VES RETENTION LEAKED, AT VB

     LEVEL 1 NO.<MED.=  8 NO. EXP.=  7     NO.>=MED.=  6 NO. EXP.=  7   CHI-SQ.=   0.3 DF= 1 SIG.= 0.593
     LEVEL 2 NO.<MED.= 25 NO. EXP.= 29     NO.>=MED.= 33 NO. EXP.= 29   CHI-SQ.=   1.1 DF= 1 SIG.= 0.293
     LEVEL 3 NO.<MED.= 20 NO. EXP.= 18     NO.>=MED.= 16 NO. EXP.= 18   CHI-SQ.=   0.4 DF= 1 SIG.= 0.505
     LEVEL 4 NO.<MED.= 18 NO. EXP.= 17     NO.>=MED.= 17 NO. EXP.= 18   CHI-SQ.=   0.1 DF= 1 SIG.= 0.735
     LEVEL 5 NO.<MED.=  3 NO. EXP.=  3     NO.>=MED.=  4 NO. EXP.=  4   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   1.9 DF=  9  SIG.= 0.992

0    ISSUE GROUP =   3   ISSUE =   4   S POOL DF

     LEVEL 1 NO.<MED.=  8 NO. EXP.=  7     NO.>=MED.=  7 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
     LEVEL 2 NO.<MED.= 39 NO. EXP.= 38     NO.>=MED.= 37 NO. EXP.= 38   CHI-SQ.=   0.1 DF= 1 SIG.= 0.819
     LEVEL 3 NO.<MED.= 13 NO. EXP.= 15     NO.>=MED.= 17 NO. EXP.= 15   CHI-SQ.=   0.5 DF= 1 SIG.= 0.465
     LEVEL 4 NO.<MED.= 11 NO. EXP.= 12     NO.>=MED.= 13 NO. EXP.= 12   CHI-SQ.=   0.2 DF= 1 SIG.= 0.683
     LEVEL 5 NO.<MED.=  3 NO. EXP.=  2     NO.>=MED.=  2 NO. EXP.=  3   TEST CANNOT BE RUN; EXP. NO. < 3
     OVERALL CHI-SQ=   1.0 DF=  7  SIG.= 0.994

0    ISSUE GROUP =   3   ISSUE =   5   S POOL DF, VOL I
```

```
      LEVEL 1 NO.<MED.=  2 NO. EXP.=  2     NO.>=MED.=  2 NO. EXP.=  2   TEST CANNOT BE RUN; EXP. NO. < 3
      LEVEL 2 NO.<MED.= 21 NO. EXP.= 17     NO.>=MED.= 14 NO. EXP.= 18   CHI-SQ.=   1.8 DF= 1 SIG.= 0.176
      LEVEL 3 NO.<MED.= 26 NO. EXP.= 23     NO.>=MED.= 20 NO. EXP.= 23   CHI-SQ.=   0.8 DF= 1 SIG.= 0.376
      LEVEL 4 NO.<MED.= 22 NO. EXP.= 25     NO.>=MED.= 28 NO. EXP.= 25   CHI-SQ.=   0.7 DF= 1 SIG.= 0.396
      LEVEL 5 NO.<MED.=  3 NO. EXP.=  7     NO.>=MED.= 12 NO. EXP.=  8   CHI-SQ.=   4.3 DF= 1 SIG.= 0.038
      OVERALL CHI-SQ=   7.6 DF=  7  SIG.= 0.367

0     ISSUE GROUP =   3   ISSUE =   6   REVOL FROM RPV (FRVOL)

      LEVEL 1 NO.<MED.=  2 NO. EXP.=  2     NO.>=MED.=  2 NO. EXP.=  2   TEST CANNOT BE RUN; EXP. NO. < 3
      LEVEL 2 NO.<MED.= 28 NO. EXP.= 23     NO.>=MED.= 19 NO. EXP.= 24   CHI-SQ.=   2.1 DF= 1 SIG.= 0.145
      LEVEL 3 NO.<MED.= 37 NO. EXP.= 38     NO.>=MED.= 39 NO. EXP.= 38   CHI-SQ.=   0.1 DF= 1 SIG.= 0.819
      LEVEL 4 NO.<MED.=  7 NO. EXP.= 11     NO.>=MED.= 16 NO. EXP.= 12   CHI-SQ.=   2.8 DF= 1 SIG.= 0.095
      OVERALL CHI-SQ=   5.0 DF=  5  SIG.= 0.420

0     ISSUE GROUP =   3   ISSUE =   7   CCI REL

      LEVEL 1 NO.<MED.= 12 NO. EXP.=  9     NO.>=MED.=  6 NO. EXP.=  9   CHI-SQ.=   2.0 DF= 1 SIG.= 0.157
      LEVEL 2 NO.<MED.= 32 NO. EXP.= 31     NO.>=MED.= 30 NO. EXP.= 31   CHI-SQ.=   0.1 DF= 1 SIG.= 0.799
      LEVEL 3 NO.<MED.= 24 NO. EXP.= 27     NO.>=MED.= 31 NO. EXP.= 28   CHI-SQ.=   0.7 DF= 1 SIG.= 0.419
      LEVEL 4 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
      OVERALL CHI-SQ=   3.0 DF=  7  SIG.= 0.886

0     ISSUE GROUP =   3   ISSUE =   8   RB DF

      LEVEL 1 NO.<MED.= 18 NO. EXP.= 12     NO.>=MED.=  7 NO. EXP.= 13   CHI-SQ.=   5.8 DF= 1 SIG.= 0.016
      LEVEL 2 NO.<MED.= 34 NO. EXP.= 29     NO.>=MED.= 24 NO. EXP.= 29   CHI-SQ.=   1.7 DF= 1 SIG.= 0.189
      LEVEL 3 NO.<MED.= 18 NO. EXP.= 26     NO.>=MED.= 34 NO. EXP.= 26   CHI-SQ.=   4.9 DF= 1 SIG.= 0.027
      LEVEL 4 NO.<MED.=  4 NO. EXP.=  7     NO.>=MED.= 11 NO. EXP.=  8   CHI-SQ.=   2.4 DF= 1 SIG.= 0.120
      OVERALL CHI-SQ=  14.8 DF=  7  SIG.= 0.038

0     ISSUE GROUP =   3   ISSUE =   9   RCF BAY DF

      LEVEL 1 NO.<MED.=  7 NO. EXP.=  6     NO.>=MED.=  5 NO. EXP.=  6   CHI-SQ.=   0.3 DF= 1 SIG.= 0.564
      LEVEL 2 NO.<MED.= 13 NO. EXP.= 13     NO.>=MED.= 14 NO. EXP.= 14   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
      LEVEL 3 NO.<MED.= 27 NO. EXP.= 28     NO.>=MED.= 30 NO. EXP.= 29   CHI-SQ.=   0.1 DF= 1 SIG.= 0.791
      LEVEL 4 NO.<MED.= 27 NO. EXP.= 27     NO.>=MED.= 27 NO. EXP.= 27   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
      OVERALL CHI-SQ=   0.4 DF=  7  SIG.= 1.000

0     ISSUE GROUP =   3   ISSUE =  10   LATE RELEASE FRACT, IODINE

      LEVEL 1 NO.<MED.=  5 NO. EXP.=  3     NO.>=MED.=  2 NO. EXP.=  4   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
      LEVEL 2 NO.<MED.= 24 NO. EXP.= 24     NO.>=MED.= 25 NO. EXP.= 25   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
      LEVEL 3 NO.<MED.= 36 NO. EXP.= 36     NO.>=MED.= 37 NO. EXP.= 37   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
      LEVEL 4 NO.<MED.=  9 NO. EXP.= 10     NO.>=MED.= 12 NO. EXP.= 11   CHI-SQ.=   0.2 DF= 1 SIG.= 0.662
      OVERALL CHI-SQ=   0.2 DF=  7  SIG.= 1.000
```

```
CONSEQUENCE MEASURE:
  EARLY ILLNESS

   BASE CASE :
    PEACH BOTTOM LLH (CRAC2)
    ISSUE LEVELS FOR EACH SAMPLE MEMBER, IN ORDER OF INCREASING RISK
 RISK                 ISSUE LEVELS, FOR ALL ISSUES
             1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
2.545E-08    3  2  3  2  3  2  4  3  1  1  8  3  1  2  2  3  4  2  2  2  1  2  2  2  4  2  2  2  2  2  1  2
3.311E-08    2  2  2  1  1  2  3  3  4  1  6  3  2  2  2  1  2  1  2  2  2  2  2  2  2  2  4  3  3  2  2  2
8.420E-08    2  1  2  2  1  4  1  3  3  1  3  3  1  2  2  2  2  2  2  1  2  2  1  2  2  3  4  3  2  1  4  3
1.117E-07    2  2  3  1  1  3  2  3  2  1  6  2  2  2  1  3  5  2  1  1  1  2  2  3  5  4  3  3  1  2  4  2
1.770E-07    3  3  1  1  1  2  3  4  3  1  6  2  2  2  2  2  1  2  2  2  2  2  2  3  4  2  3  2  3  2  2  3
1.784E-07    3  3  3  1  1  1  2  2  3  1  4  3  2  1  2  2  2  2  2  1  2  2  3  1  2  2  2  3  1  2  4  3
1.838E-07    3  3  2  2  3  3  3  1  1  1  9  3  2  1  1  1  3  2  2  1  2  2  1  3  2  3  4  2  2  1  2  1
2.038E-07    3  2  2  1  3  3  3  2  3  1  5  3  2  2  2  1  2  3  2  2  2  2  2  1  4  2  4  3  2  2  4  1
2.191E-07    3  3  2  1  1  2  3  3  2  1  6  2  2  1  2  2  2  2  2  2  2  2  2  4  3  2  4  4  1  1  1  2
2.569E-07    3  1  3  2  4  2  1  3  3  1  7  3  2  2  2  1  3  1  2  1  1  2  2  2  2  2  3  4  2  2  3  2
2.949E-07    2  2  2  2  2  1  3  3  2  1  6  3  2  2  2  2  2  2  1  2  2  2  2  2  4  2  4  2  2  2  3  3
2.976E-07    2  3  1  1  3  3  3  4  3  2  5  2  2  1  2  3  3  2  1  2  2  2  3  2  4  2  3  3  2  1  3  2
3.416E-07    3  2  3  1  3  4  3  2  2  2  8  2  2  1  2  2  2  1  2  1  2  2  1  3  5  3  2  3  1  3  3  4
3.483E-07    2  2  2  1  4  2  2  3  2  1  7  3  2  1  2  1  1  2  2  2  1  2  2  3  4  2  3  3  3  2  4  4
3.487E-07    2  2  3  2  2  3  3  4  4  1  6  2  2  2  1  1  2  2  2  2  2  2  2  3  2  2  3  3  3  1  3  4
3.534E-07    2  2  3  2  3  4  2  3  3  1  6  2  2  1  2  4  1  2  2  2  1  1  2  4  2  2  3  2  1  2  3  2
3.745E-07    2  2  2  1  2  4  3  3  2  1  8  2  2  2  2  3  2  1  2  2  1  2  3  1  3  2  4  4  3  1  3  4
3.685E-07    4  2  3  2  2  3  3  1  2  2  7  2  2  2  1  2  1  2  2  2  1  2  2  3  3  3  2  3  3  1  4  3
4.192E-07    1  3  3  1  2  3  2  1  3  1  6  2  2  2  2  3  5  3  2  1  1  2  2  4  4  3  4  3  3  1  1  3
4.261E-07    1  3  3  2  1  3  2  2  3  2  3  2  2  1  2  3  3  1  1  1  2  2  2  4  4  2  2  3  3  1  3  2
4.394E-07    1  3  2  1  3  3  4  2  3  1  3  3  2  1  2  2  2  3  2  2  2  2  2  1  2  2  3  2  1  3  3  2
4.556E-07    3  2  1  1  2  2  3  2  1  1  1  3  2  1  1  1  2  1  1  2  1  2  2  4  3  4  4  3  2  1  3  3
4.615E-07    3  2  1  1  3  1  1  3  4  1  9  2  2  2  2  2  4  2  2  2  1  2  2  2  2  4  2  3  2  3  3  2
4.808E-07    3  2  3  2  1  2  3  2  2  1  7  2  2  2  1  3  1  2  2  1  1  1  3  3  2  2  1  2  2  2  4  3
4.951E-07    3  3  2  1  2  2  2  3  2  1  6  2  2  1  2  2  1  1  2  1  2  2  1  2  2  2  3  3  2  3  3  2
6.107E-07    3  3  1  2  2  3  2  2  1  1  6  1  1  1  1  4  3  2  2  2  2  2  2  1  3  1  4  2  1  3  4  2
6.817E-07    2  2  2  1  2  2  2  3  3  1  9  2  2  2  1  2  4  2  2  2  2  2  1  2  4  5  4  2  2  2  4  3
7.168E-07    3  3  1  1  2  3  4  3  3  1  3  3  2  2  1  2  2  1  1  2  1  2  2  2  2  2  2  3  3  1  4  3
7.771E-07    4  3  3  1  3  2  3  1  3  2  6  3  2  2  2  3  3  1  2  2  2  2  1  1  3  2  2  2  3  2  2  2
8.281E-07    2  2  2  2  2  2  3  3  3  1  8  2  2  1  1  2  2  1  2  2  1  2  1  2  1  2  3  2  1  1  4  3
8.875E-07    2  3  1  2  3  3  2  3  2  1  4  2  2  2  1  2  2  2  2  1  1  2  3  3  2  3  3  3  4  1  3  2
9.089E-07    2  2  2  2  2  2  2  2  3  1  6  2  2  1  1  1  1  1  2  2  1  2  2  1  2  4  2  3  3  2  1  3
9.134E-07    2  3  2  2  3  2  2  2  2  1  4  1  2  2  2  1  3  2  2  1  1  2  2  1  4  2  2  3  2  2  3  4
9.390E-07    2  3  3  1  3  2  2  3  4  2  8  2  2  1  2  3  2  1  2  1  1  2  2  2  2  4  4  2  2  2  4  2
9.436E-07    3  2  4  1  3  3  3  2  3  2  2  2  2  2  1  3  3  1  2  2  1  2  3  1  4  3  5  1  2  3  4  3
1.040E-06    4  3  3  1  2  3  3  3  2  1  6  2  2  1  2  2  2  1  2  1  2  2  2  3  3  4  2  3  3  2  2  3
1.317E-06    3  3  2  1  2  1  2  3  3  1  2  2  2  2  2  2  3  2  2  1  1  2  1  2  3  3  4  3  2  4  4  3
1.319E-06    3  3  4  2  2  3  2  3  2  1  7  2  1  1  1  2  1  2  2  1  1  [illegible]  2  4  3  2  2  1  2  3  2  3
1.476E-06    1  3  3  2  3  2  3  3  4  1  7  3  2  2  2  2  2  2  1  1  2  2  3  2  3  2  4  2  2  2  2  2
1.542E-06    1  2  2  2  4  3  2  3  3  1  8  2  2  1  1  2  3  3  2  2  1  2  3  3  4  1  4  2  2  2  4  2
1.739E-06    2  1  4  1  4  2  3  2  2  1  4  3  2  2  2  2  3  1  2  1  1  2  2  4  3  2  4  4  2  3  4  3
1.825E-06    3  2  2  1  1  1  3  2  2  1  5  2  2  2  1  3  4  2  1  2  1  2  2  2  3  3  5  2  2  2  4  4
1.912E-06    3  2  3  1  1  3  3  4  2  1  5  3  2  1  1  2  3  2  1  2  1  2  3  3  1  2  3  3  1  3  4  3
1.928E-06    2  3  3  1  4  2  2  3  3  1  6  2  2  2  1  2  4  2  1  1  1  2  3  3  3  4  3  2  1  2  4  3
2.020E-06    3  2  1  2  3  2  3  2  3  1  2  3  1  1  2  3  3  1  2  2  2  2  2  3  1  2  2  3  2  3  3  3
2.079E-06    4  3  3  2  2  3  3  1  2  1  4  2  1  1  2  2  5  1  2  2  1  2  3  2  2  2  4  2  3  1  4  3
2.226E-06    3  3  2  1  3  3  1  1  4  1  5  3  2  1  2  2  3  1  2  2  2  2  2  3  1  2  4  3  3  1  2  3
2.281E-06    2  3  3  2  2  2  2  2  2  1  2  3  2  1  2  3  2  2  2  2  2  2  2  2  5  2  2  3  4  2  2  3
2.349E-06    3  1  2  1  2  3  2  2  2  2  5  2  2  1  2  2  3  2  2  1  2  2  3  2  2  4  3  3  3  3  3  4
2.405E-06    4  2  1  1  2  4  1  1  4  1  8  3  2  2  2  1  3  2  1  1  1  2  2  2  4  2  4  3  1  3  2  3
2.860E-06    3  2  3  1  4  1  3  3  2  1  6  2  2  1  1  2  4  2  1  1  2  2  3  3  5  4  2  3  2  3  3  3
2.863E-06    3  3  2  2  2  2  3  2  2  1  8  2  2  1  2  2  2  2  2  2  2  2  3  2  2  2  5  3  3  3  4  3
2.916E-06    2  2  3  1  3  3  2  1  3  1  5  2  2  2  2  2  3  1  1  2  2  2  1  3  1  2  5  3  1  2  3  1
2.932E-06    2  3  4  2  3  2  2  2  3  1  5  2  1  2  2  2  2  1  1  1  1  2  3  1  2  2  3  3  2  2  2  3
2.966E-06    2  3  4  2  3  3  3  2  3  2  3  2  2  2  2  2  1  1  1  2  2  2  2  3  5  1  4  3  1  3  3  2
3.011E-06    3  2  2  1  3  2  3  3  4  1  7  2  1  1  1  2  3  2  2  2  2  2  3  3  4  4  2  3  3  3  3  1
3.272E-06    3  4  2  2  4  3  2  3  2  1  5  2  2  2  2  2  4  2  2  1  2  2  3  3  2  2  3  2  3  2  4  2
3.275E-06    3  2  1  2  3  3  3  3  3  2  5  2  2  1  1  2  5  2  2  2  1  2  2  2  2  2  3  2  2  2  2  3
3.297E-06    3  1  2  1  2  3  1  4  2  1  2  2  2  1  1  2  3  2  2  1  2  1  2  1  2  2  3  2  2  2  2  4
3.505E-06    2  4  3  1  4  2  2  2  3  2  7  3  2  2  1  2  1  2  2  1  2  2  3  2  1  3  2  2  4  1  2  3
3.543E-06    2  3  3  1  1  3  2  3  3  2  7  2  2  2  1  2  2  2  2  2  1  2  2  3  4  1  3  3  2  3  4  3
3.933E-06    3  2  3  1  2  2  3  3  4  1  6  2  2  2  1  4  4  2  2  1  2  2  3  3  3  2  3  2  3  2  3  4
3.967E-06    2  1  3  2  2  4  3  2  2  1  7  2  2  1  2  1  3  1  1  1  2  1  3  1  2  4  1  2  2  2  4  3
4.231E-06    3  2  3  2  2  2  3  2  1  1  5  3  2  2  1  2  2  2  2  2  1  1  2  2  4  4  4  3  2  1  4  3
4.827E-06    3  2  2  1  2  4  2  3  3  1  8  3  2  1  2  2  1  1  1  2  2  2  3  1  4  3  4  3  3  2  3  3
5.149E-06    2  2  4  1  4  2  3  3  3  1  6  2  2  2  1  3  2  2  2  2  1  2  1  1  2  2  2  3  2  1  4  3
5.194E-06    1  1  3  2  2  3  4  2  2  1  2  2  2  2  2  1  3  2  1  2  1  1  2  2  3  3  3  2  2  3  2  3
5.465E-06    1  1  3  1  2  3  4  2  2  1  3  3  2  1  2  2  2  1  1  2  1  2  2  1  2  2  2  2  3  3  3  3
5.523E-06    2  1  3  2  2  1  2  3  4  1  5  2  2  2  1  2  2  3  1  2  2  2  2  3  1  2  3  3  4  2  4  2
5.635E-06    4  2  1  2  2  3  2  1  4  1  4  3  2  1  1  2  1  2  1  1  1  1  3  2  4  3  4  4  2  4  4  3
6.038E-06    3  1  2  2  1  2  1  2  1  1  8  3  2  1  2  3  4  2  2  2  1  2  3  2  3  1  2  2  4  4  4  3
6.495E-06    2  2  3  2  2  3  4  2  2  1  9  3  2  2  1  3  3  2  1  1  1  2  1  1  4  3  4  2  2  4  1  2
7.119E-06    1  3  2  1  2  2  2  3  2  1  8  2  2  1  1  2  2  1  2  2  1  2  3  2  3  2  3  3  2  3  1  2
7.534E-06    2  3  2  1  2  4  3  2  3  2  6  2  2  1  1  2  1  1  2  1  2  2  1  3  4  1  1  4  2  2  3  2
8.544E-06    2  3  2  1  2  1  2  3  1  1  5  3  2  2  1  2  1  1  2  2  1  2  2  1  2  5  2  4  1  2  2  2
9.236E-06    2  1  2  2  3  3  2  1  2  2  6  2  2  1  1  2  3  1  2  2  2  2  2  2  3  1  4  2  3  3  3  1
1.013E-05    2  3  3  2  3  3  2  3  2  1  1  2  2  1  1  3  2  2  2  2  2  2  3  2  4  4  4  2  2  3  1  3
```

```
1.121E-05  3  2  2  1  3  3  3  4  2  1  6  2  2  1  2  3  1  2  1  1  1  2  3  3  3  1  5  3  3  1  3  4
1.202E-05  1  2  2  1  2  2  3  3  3  1  5  2  2  2  1  2  4  1  2  1  2  1  4  4  1  5  3  3  3  2  1  2
1.219E-05  2  3  3  1  3  3  2  1  1  1  7  2  2  1  1  2  2  2  2  2  2  2  2  2  1  1  3  3  3  2  3  3
1.228E-05  1  2  2  2  4  4  1  2  2  1  2  2  2  1  2  2  1  1  2  2  2  1  1  2  5  5  4  1  3  2  3  2
1.254E-05  2  1  4  1  3  2  3  1  3  1  6  2  2  2  2  2  2  3  1  2  2  2  2  3  2  2  3  3  1  3  2  3
1.309E-05  3  2  2  1  3  1  2  2  2  1  9  2  2  2  1  3  1  3  2  1  2  2  2  3  2  3  3  4  2  3  4  3
1.316E-05  2  2  2  1  3  4  3  2  2  1  6  3  2  2  2  3  5  2  1  1  2  2  1  4  2  2  2  3  2  2  4  3
1.371E-05  3  2  3  1  3  3  2  2  2  1  7  3  2  1  2  3  4  3  1  1  1  2  2  2  2  3  5  3  2  3  2  3
1.392E-05  2  4  3  2  2  3  2  3  2  1  3  3  2  1  2  2  5  1  2  2  2  2  2  2  2  2  3  3  2  3  3  2
1.747E-05  2  3  1  1  3  2  3  3  3  1  7  3  2  2  1  3  2  1  2  2  2  1  2  2  2  2  4  3  2  3  3  2
1.785E-05  3  2  3  1  3  3  4  4  3  1  7  2  2  2  1  3  2  1  1  1  1  2  4  3  2  3  2  3  3  3  4  2
1.934E-05  4  2  2  2  3  2  4  2  3  1  3  2  2  2  1  2  1  2  1  2  2  2  2  3  4  2  2  4  2  4  3  4
2.076E-05  3  4  4  1  3  2  2  4  2  2  8  2  2  2  2  2  4  2  2  2  2  1  1  3  3  2  3  3  4  2  3  3
2.227E-05  3  2  3  1  3  2  2  3  1  1  5  2  2  2  2  3  1  2  1  1  2  1  1  2  2  3  5  1  2  1  1  4
2.323E-05  3  4  4  1  2  3  3  2  2  1  3  2  2  2  2  3  1  2  1  2  2  2  2  2  2  4  4  3  1  2  3  3
2.421E-05  3  4  3  1  2  2  2  2  3  1  6  3  2  2  2  3  5  1  1  2  1  2  2  2  4  2  5  3  2  2  3  4
2.991E-05  4  2  4  2  1  3  3  2  3  1  6  3  2  1  2  3  1  2  2  2  1  2  1  3  1  4  4  4  3  4  3  2
3.312E-05  3  3  3  2  2  3  3  3  2  1  6  2  1  2  1  2  4  3  2  1  1  1  2  3  3  4  3  4  2  1  4  2
3.538E-05  2  3  3  2  2  3  2  2  4  2  9  2  2  1  1  3  2  2  1  1  2  2  2  1  1  2  3  4  2  2  3  3
3.548E-05  2  3  2  1  2  2  3  2  4  1  7  2  2  1  2  3  3  1  1  2  1  2  1  2  3  1  1  3  2  2  2  3
3.565E-05  3  3  2  2  2  2  3  3  3  2  6  2  1  2  2  3  2  1  1  1  1  2  2  3  1  3  3  2  2  3  3  3
3.569E-05  2  3  2  1  2  2  1  3  1  1  4  2  2  1  2  2  3  2  1  2  2  2  1  2  1  2  2  2  2  2  4  3
3.636E-05  2  3  4  2  2  3  1  2  3  1  6  3  2  2  2  2  2  1  1  2  1  2  2  4  2  2  3  2  4  2  4  2
3.689E-05  3  3  4  2  2  1  2  3  3  1  4  2  2  2  2  3  5  2  1  2  2  2  2  3  2  2  4  3  2  2  4  4
3.708E-05  4  3  3  1  2  3  2  3  2  1  3  2  2  1  1  2  4  1  1  1  2  2  3  4  2  1  4  2  3  2  2  2
3.869E-05  3  2  3  2  3  2  3  4  2  1  8  2  2  2  1  2  3  1  2  1  1  2  1  3  4  2  5  3  3  2  3  3
4.190E-05  2  2  2  2  3  1  1  3  1  1  2  2  2  1  1  3  3  1  1  2  2  2  1  2  3  2  2  3  2  4  4  2
4.810E-05  3  3  2  2  2  2  2  3  2  1  3  3  2  2  2  2  3  1  1  1  1  1  2  4  3  2  2  3  2  4  2  3
4.873E-05  2  3  2  1  2  3  2  1  3  1  5  2  1  1  1  3  5  2  1  2  1  2  1  2  2  5  2  3  3  2  2  3
4.886E-05  2  3  3  1  3  2  4  3  2  1  2  3  2  1  2  1  3  2  2  2  2  2  3  3  2  4  5  3  3  3  4  3
5.269E-05  3  2  2  2  2  3  2  3  4  1  2  2  2  1  1  3  5  2  2  1  1  1  2  3  3  3  5  4  3  3  4  2
5.421E-05  3  3  4  1  3  2  1  4  3  2  7  2  1  1  1  1  2  1  1  2  2  1  3  4  3  4  3  3  1  3  4  3
5.476E-05  2  3  2  1  3  2  3  3  1  2  5  2  1  2  2  2  2  2  1  2  2  2  2  1  4  3  3  3  3  2  4  2
5.549E-05  2  3  3  1  3  2  3  2  3  1  7  2  1  1  2  3  2  1  1  1  1  2  2  3  3  2  4  3  2  2  4  4
5.566E-05  4  3  3  2  3  3  2  4  3  2  3  3  2  1  2  3  2  2  1  1  1  1  3  2  4  4  2  3  2  3  3  3
5.647E-05  4  2  3  1  4  2  3  4  3  2  6  2  1  1  2  2  3  2  1  1  2  2  2  1  2  2  4  2  4  2  1  3
6.850E-05  2  2  2  1  2  3  1  3  3  1  3  2  2  2  1  3  2  2  2  2  1  2  1  3  3  2  2  2  3  4  3  3
7.383E-05  3  3  2  1  3  2  2  2  2  1  7  3  2  1  1  3  1  3  1  2  1  2  3  1  3  4  4  4  2  3  3  1
7.461E-05  2  3  2  2  3  3  3  2  2  1  7  3  2  1  1  4  3  2  1  2  1  2  2  2  3  3  3  3  2  3  2  4
7.580E-05  3  3  2  2  3  4  4  3  3  1  5  3  2  1  1  1  5  2  1  2  1  2  1  3  2  2  3  2  2  4  4  2
8.185E-05  1  1  2  1  2  2  4  2  2  2  6  2  2  2  1  2  4  1  1  1  2  2  2  3  4  3  4  4  4  4  3  3
8.975E-05  1  2  2  2  2  2  3  2  2  1  4  3  2  2  1  3  2  2  1  2  1  2  2  1  3  1  2  3  4  3  4  2
9.133E-05  3  3  2  1  4  1  2  2  2  1  9  2  2  1  2  2  4  1  1  2  1  2  2  2  2  2  3  3  1  3  4  2
9.262E-05  2  2  2  2  2  3  3  2  2  1  9  2  2  2  1  2  3  2  1  2  2  2  2  3  1  3  5  3  3  3  4  4
9.396E-05  3  2  2  1  2  3  3  2  3  1  9  2  2  1  1  2  1  2  1  2  2  1  1  4  4  2  3  3  3  2  3  2
1.068E-04  3  2  3  1  2  3  1  2  2  2  2  2  2  2  1  2  2  2  1  2  1  1  3  2  2  1  3  2  3  3  2  2
1.082E-04  2  4  2  1  3  3  2  3  3  1  6  3  2  1  1  2  4  1  2  2  1  2  2  1  5  2  3  2  3  2  3  3
1.246E-04  2  3  4  1  4  4  3  3  3  1  3  3  2  2  2  3  1  1  1  1  2  2  1  2  4  4  3  2  3  2  4  3
1.729E-04  3  2  3  1  3  2  2  2  2  1  3  2  2  2  2  3  3  2  2  2  1  2  2  3  4  2  1  4  3  3  3  3
2.028E-04  4  2  2  1  3  2  3  2  3  1  3  2  2  1  1  3  2  1  2  2  2  1  2  3  4  1  4  2  3  1  4  3
2.113E-04  2  1  3  1  3  1  3  3  3  1  3  2  2  2  1  2  4  1  2  2  1  1  1  1  3  2  5  4  2  1  2  3
2.563E-04  3  1  4  1  3  3  2  4  3  1  8  3  2  1  1  3  5  1  1  2  2  1  2  1  2  3  3  4  3  2  1  1
2.630E-04  2  4  3  1  3  4  2  3  2  1  6  2  2  2  1  3  3  1  2  2  2  2  3  3  2  2  2  3  2  4  3  3
2.682E-04  1  2  3  1  3  2  3  2  2  1  6  2  2  1  1  2  1  2  1  1  2  2  4  3  2  1  4  4  3  4  1  2
2.684E-04  4  2  1  2  3  4  4  2  2  1  6  2  2  2  2  2  4  1  1  2  2  1  3  3  2  2  3  2  3  2  3  3
2.685E-04  2  2  3  2  3  1  2  2  3  1  8  2  2  1  1  2  4  1  1  1  2  1  2  1  2  2  4  4  3  1  3  3
2.686E-04  2  2  1  2  3  2  2  4  1  1  6  2  2  2  2  3  3  1  1  1  2  2  2  3  2  2  2  3  4  3  3  3
2.786E-04  1  4  3  2  1  3  2  3  3  1  9  2  2  1  1  2  2  1  1  2  2  2  2  1  4  3  4  2  2  3  4  3
2.831E-04  3  2  3  2  3  2  2  3  3  1  3  2  2  1  2  2  1  3  1  1  2  2  1  3  3  3  4  4  4  3  4  2
3.190E-04  3  4  3  1  4  3  3  1  3  2  6  2  2  1  1  2  4  1  2  2  1  1  2  2  2  3  4  3  2  4  4  4
3.850E-04  4  4  3  2  1  2  4  3  2  1  5  1  2  1  1  2  1  2  1  2  1  2  1  2  3  2  2  4  4  2  3  2
5.853E-04  3  4  2  2  3  2  2  3  2  1  3  3  2  2  1  2  5  3  2  1  2  2  3  2  2  2  4  3  2  3  3  4
5.897E-04  4  4  3  2  2  3  2  2  2  1  6  3  2  1  1  2  3  2  1  2  1  2  3  2  4  2  2  3  3  3  3  3
7.231E-04  3  3  3  2  2  2  2  2  1  1  9  3  2  2  2  3  3  1  1  2  2  1  3  2  2  3  4  3  3  3  4  3
7.235E-04  1  3  1  1  2  3  2  2  3  1  5  1  2  2  2  2  2  1  1  1  1  1  1  2  2  2  4  4  3  1  3  2
7.253E-04  2  3  2  1  2  2  4  2  4  1  5  3  2  1  2  2  5  2  1  1  1  2  1  2  2  2  3  2  3  3  3  2
7.282E-04  2  3  2  1  2  3  3  3  2  1  8  1  2  1  2  2  4  3  1  1  1  2  1  3  3  2  4  3  4  3  4  3
8.074E-04  2  4  3  1  3  4  1  2  3  1  6  2  2  2  1  3  2  3  1  2  1  2  1  2  2  2  5  3  3  2  3  4
8.499E-04  2  2  2  1  4  2  3  2  1  1  9  2  2  1  2  3  1  1  1  1  1  1  2  4  4  2  3  2  3  3  4  2
1.119E-03  3  3  3  2  3  1  3  1  2  1  3  3  2  2  1  3  3  2  1  2  2  1  3  1  4  3  5  2  3  3  3  2
1.125E-03  3  3  3  1  3  3  2  2  2  1  6  2  2  2  1  1  5  1  1  2  1  2  2  1  2  4  4  3  3  3  2  4
1.128E-03  2  3  2  1  3  2  3  2  3  1  7  2  2  2  1  2  1  3  1  2  1  2  3  3  2  4  4  2  3  4  2  2
8.958E-03  2  4  2  1  2  3  4  4  3  1  5  3  2  1  1  3  1  2  1  1  1  1  1  2  3  4  4  2  4  3  3  3

     MEAN =     1.593E-04     VARIANCE =     5.737E-07

     PERCENTILES :
          5-TH =     2.038E-07  50-TH =     8.883E-06  95-TH =     7.253E-04
     LOGARITHMIC MIDPOINT (OF POINTS > 0.) =     1.510E-05
     NUMBER ABOVE MIDPOINT = 64
     NUMBER BELOW MIDPOINT =  86
     CHI-SQUARED(1) =     3.227E+00
     DO NOT REJECT NULL (p > .05)
```

```
CONSEQUENCE MEASURE:
  EARLY ILLNESS


  BASE CASE :
   PEACH BOTTOM LLH (CRAC2)

  FRACTIONAL CONTRIBUTION OF EACH SEQUENCE TO MEAN RISK
                   SEQUENCE               CONTRIBUTION
                      TB                     0.2078
                     TBUX                    0.7690
                      TBU                    0.0154
                     TCSX                    0.0006
                     TCUX                    0.0001
                    TCSRX2                   0.0043
                    TCSRV23                  0.0029
```

```
CONSEQUENCE MEASURE:
  EARLY ILLNESS


  BASE CASE :
   PEACH BOTTOM LLH (CRAC2)

  FRACTIONAL CONTRIBUTION OF EACH NONZERO BIN TO MEAN RISK
                            BIN                CONTRIBUTION
            BAACACGBDAACBBBBHHABBB                0.0001
            BAACACGBDAACBDDBHHABBB                0.0001
            BAACCCGGDAACBADBDDABBB                0.0001
            CAACCCBGDDACBCDBADABAB                0.0001
            CAACCCBGDDACBCDBAEABAB                0.0001
            DAAAAAGBDABCBBBBHHABBB                0.0001
            DAAAAAGBDDACBBBBHHABBB                0.0001
            DAAAAAGBFDACCBBBHHABBB                0.0001
            DAAAACGBDDACBBBBHHABBB                0.0002
            DAAAACGBDDACBDDBHHABBB                0.0001
            DAAAACGBFDACCBBBHHABBB                0.0002
            DAAAACGBFDACCDDBHHABBB                0.0005
            DAAAACGGDDACBBBBAEABAB                0.0001
            DAAAACGGDDACBDDBACABAB                0.0001
            DAAAACGGDDACBDDBADABAB                0.0001
            DAAAACGGDDACBDDBAEABAB                0.0007
            DAAAACGGDDACBDDBAGABAB                0.0003
            DAAACCGBDDACBDDBHHABBB                0.0004
            DAAACCGBFDACCDDBHHABBB                0.0001
            DAAACCGGDDACBBBBADABAB                0.0001
            DAAACCGGDDACBBBBAEABAB                0.0001
            DAAACCGGDDACBDDBACABAB                0.0001
            DAAACCGGDDACBDDBADABAB                0.0001
            DABAACGADABCBBBBHGABAB                0.0004
            DABAACGADDACBBBBHGABAB                0.0020
            DABAACGADDACBDDBHGABAB                0.0003
            EBAACCGGDDBCBABBEGABBB                0.0015
            EBAACCGGDDBCBABBEGBBBB                0.0008
            EBAACCGGDDBCBABBEHABBB                0.0019
            EBAACCGGDDBCBABBEHBBBB                0.0038
            EBAACCGGDDBCBADBEHABBB                0.0032
            EBAACCGGDDBCBADBEHBBBB                0.0042
            EBACBBGGDCBCBABBFBBABA                0.0017
            EBACBBGGDCBCBABBFDABBA                0.0002
            EBACBCGGDCBCBABBFBBABA                0.0003
            EBACBCGGDCBCBABBFDABBA                0.0003
            EBACBCGGDCBCBADBFBBABA                0.0015
            EBACBCGGDCBCBADBFFABBA                0.0001
            EBACCCDGFDBCBADBFBBABB                0.0013
            EBACCCFGFDBCBABBFCBABB                0.0001
            EBACCCFGFDBCBABBFEABBB                0.0016
            EBACCCFGFDBCBACBFCBABB                0.0001
            EBACCCFGFDBCBADBFCBABB                0.0007
            EBACCCFGFDBCBADBFEABBB                0.0002
            EBACCCFGFDBCBADBFEBBBB                0.0001
            EBACCCGEFDBCCABBFEABBB                0.0001
            EBACCCGEFDBCCADBFCBABB                0.0003
            EBACCCGGDDBBBABBFBBABB                0.0001
            EBACCCGGDDBBBABBFEABBB                0.0007
            EBACCCGGDDBBBABBFFABBB                0.0005
            EBACCCGGDDBBBADBFABABB                0.0005
            EBACCCGGDDBBBADBFCBABB                0.0005
            EBACCCGGDDBBBADBFEABBB                0.0001
            EBACCCGGDDBBBADBFFBBBB                0.0001
            EBACCCGGDDBCBABBFABABB                0.0388
```

EBACCCGGDDBCBABBFBABAB	0.0001
EBACCCGGDDBCBABBFBBABB	0.1091
EBACCCGGDDBCBABBFCBABB	0.0378
EBACCCGGDDBCBABBFCBBBB	0.0012
EBACCCGGDDBCBABBFDABBB	0.0546
EBACCCGGDDBCBABBFDBBBB	0.0004
EBACCCGGDDBCBABBFEABBB	0.0079
EBACCCGGDDBCBABBFEBBBB	0.0136
EBACCCGGDDBCBABBFFABBB	0.0049
EBACCCGGDDBCBABBFFBBBB	0.0027
EBACCCGGDDBCBABBFGABBB	0.0030
EBACCCGGDDBCBADBFABABB	0.0689
EBACCCGGDDBCBADBFBBABB	0.3036
EBACCCGGDDBCBADBFCBABB	0.0025
EBACCCGGDDBCBADBFEABBB	0.0306
EBACCCGGDDBCBADBFEBBBB	0.0036
EBACCCGGDDBCBADBFFABBB	0.0266
EBACCCGGDDBCBADBFFBBBB	0.0366
EBACCCGGDDBCBADBFGABBB	0.0006
EBACCCGGEDBCBABBFCBABB	0.0045
EBACCCGGEDBCBABBFCBBBB	0.0009
EBACCCGGEDBCBABBFEABBB	0.0008
EBACCCGGEDBCBADBFCBABB	0.0040
EBACCCGGEDBCBADBFEABBB	0.0001
FCACBCGGDCBCBADBDCBABA	0.0001
FCACBCGGDCBCBADBECBABA	0.0001
FCACCCDGFDBCBADBDBBABB	0.0001
FCACCCDGFDBCBADBDEABBB	0.0001
FCACCCDGFDBCBADBEBBABB	0.0003
FCACCCDGFDBCBADBECBABB	0.0001
FCACCCGBDDBCBABBHHABBB	0.0001
FCACCCGBDDBCBABBHHBABB	0.0003
FCACCCGBDDBCBDDBHHABBB	0.0042
FCACCCGBDDBCBDDBHHBABB	0.0030
FCACCCGDFDBCBADBDCBABB	0.0001
FCACCCGEFDBCCADBEGABBB	0.0002
FCACCCGGDDBBBABBEABABB	0.0002
FCACCCGGDDBBBABBECBABB	0.0008
FCACCCGGDDBBBABBEEABBB	0.0010
FCACCCGGDDBBBABBEEBBBB	0.0001
FCACCCGGDDBBBADBEBBABB	0.0001
FCACCCGGDDBBBADBGCBABB	0.0002
FCACCCGGDDBCBABBCBBABB	0.0008
FCACCCGGDDBCBABBDABABB	0.0012
FCACCCGGDDBCBABBDBBABB	0.0062
FCACCCGGDDBCBABBDCBABB	0.0016
FCACCCGGDDBCBABBDDABBB	0.0010
FCACCCGGDDBCBABBDEABBB	0.0173
FCACCCGGDDBCBABBDEBBBB	0.0012
FCACCCGGDDBCBABBDFABBB	0.0007
FCACCCGGDDBCBABBDFBBBB	0.0001
FCACCCGGDDBCBABBDGABBB	0.0022
FCACCCGGDDBCBABBEABABB	0.0045
FCACCCGGDDBCBABBEBBABB	0.0199
FCACCCGGDDBCBABBECBABB	0.0021
FCACCCGGDDBCBABBEDABBB	0.0060
FCACCCGGDDBCBABBEEABBB	0.0139
FCACCCGGDDBCBABBEEBBBB	0.0005
FCACCCGGDDBCBABBEFABBB	0.0004
FCACCCGGDDBCBABBEFBBBB	0.0010
FCACCCGGDDBCBABBEGABBB	0.0002
FCACCCGGDDBCBABBGBBABB	0.0007
FCACCCGGDDBCBABBGCBABB	0.0102
FCACCCGGDDBCBABBHABABB	0.0001
FCACCCGGDDBCBACBEABABB	0.0002
FCACCCGGDDBCBADBDABABB	0.0034
FCACCCGGDDBCBADBDBBABB	0.0100
FCACCCGGDDBCBADBDCBABB	0.0139
FCACCCGGDDBCBADBDEABBB	0.0035
FCACCCGGDDBCBADBDEBBBB	0.0010
FCACCCGGDDBCBADBDFABBB	0.0006
FCACCCGGDDBCBADBDGABBB	0.0296
FCACCCGGDDBCBADBEABABB	0.0058
FCACCCGGDDBCBADBEBBABB	0.0042
FCACCCGGDDBCBADBECBABB	0.0161
FCACCCGGDDBCBADBEEABBB	0.0101
FCACCCGGDDBCBADBEEBBBB	0.0012
FCACCCGGDDBCBADBEFABBB	0.0029
FCACCCGGDDBCBADBEFBBBB	0.0003
FCACCCGGDDBCBADBGCBABB	0.0003
FCACCCGGDDBCBADBGEABBB	0.0003
FCACCCGGDDBCBDDBHABABB	0.0002
FCACCCGGEDBCBABBEEABBB	0.0001
FCACCCGGEDBCBABBGEABBB	0.0002
FCACCCGGEDBCBADBDCBABB	0.0001
FCCBAAGCFBBCCBBBHHABBB	0.0001

```
CONSEQUENCE MEASURE:
  EARLY ILLNESS


  BASE CASE :
   PEACH BOTTOM LLH (CRAC2)

  FRACTIONAL CONTRIBUTIONS OF EACH RELEASE TO MEAN RISK
                  RELEASE              CONTRIBUTION
                  PCH  1D                 0.0000
                  PCH  2D                 0.0000
                  PCH  3D                 0.0002
                  PCH  4D                 0.0005
                  PCH  5D                 0.0018
                  PCH  6D                 0.0045
                  PCH  7D                 0.0827
                  PCH  8D                 0.1176
                  PCH  9D                 0.7851
                  PCH 10D                 0.0000
                  PCH 11D                 0.0000
                  PCH 12D                 0.0000
                  PCH 13D                 0.0000
                  PCH 14D                 0.0000
                  PCH 15D                 0.0000
                  PCH 16D                 0.0000
                  PCH 17D                 0.0000
                  PCH 18D                 0.0000
                  PCH 19D                 0.0001
                  PCH 20D                 0.0000
                  PCH 21D                 0.0000
                  PCH 22D                 0.0000
                  PCH 23D                 0.0000
                  PCH 24D                 0.0001
                  PCH 25D                 0.0000
                  PCH 26D                 0.0000
                  PCH 27D                 0.0001
                  PCH 28D                 0.0002
                  PCH 29D                 0.0004
                  PCH 30D                 0.0001
                  PCH 31D                 0.0001
                  PCH 32D                 0.0000
                  PCH 33D                 0.0000
                  PCH 34D                 0.0001
                  PCH 35D                 0.0000
                  PCH 36D                 0.0001
                  PCH 37D                 0.0000
                  PCH 38D                 0.0013
                  PCH 39D                 0.0001
                  PCH 40D                 0.0002
                  PCH 41D                 0.0001
                  PCH 42D                 0.0002
                  PCH 43D                 0.0000
                  PCH 44D                 0.0003
                  PCH 45D                 0.0001
                  PCH 46D                 0.0021
                  PCH 47D                 0.0001
                  PCH 48D                 0.0002
                  PCH 49D                 0.0001
                  PCH 50D                 0.0011
                  PCH 51D                 0.0000
                  PCH 52D                 0.0003
                  PCH 53D                 0.0002
                  PCH 54D                 0.0000
```

```
CONSEQUENCE MEASURE:
  EARLY ILLNESS

  SENSITIVITY OF RISK TO ISSUES
  DISTRIBUTION OF RISK AT EACH LEVEL OF EACH ISSUE
  BASE CASE :
   PEACH BOTTOM LLH (CRAC2)

 GP ISS LVL NUM      5%           50%          MEAN          95%         R**2     F   DF        SIGNIF.
  1   1    3  60  0.1811E-06  0.4519E-05  0.9213E-04  0.6505E-03   0.01     0.6(  3,146)   0.64NS
           1  15  0.4209E-06  0.7119E-05  0.9922E-04  0.5700E-03
           4  15  0.4620E-06  0.2991E-04  0.1104E-03  0.5300E-03
           2  60  0.1815E-06  0.9672E-05  0.2537E-03  0.8284E-03
  1   2    1  15  0.1113E-06  0.5465E-05  0.4034E-04  0.2442E-03   0.09     5.1(  3,146)   0.00**
           2  60  0.1509E-06  0.4985E-05  0.5747E-04  0.2686E-03
           3  60  0.2007E-06  0.9302E-05  0.1243E-03  0.9029E-03
           4  15  0.3328E-05  0.2630E-03  0.8255E-03  0.4908E-02
  1   3    4  15  0.1026E-05  0.2076E-04  0.4066E-04  0.2140E-03   0.02     1.0(  3,146)   0.41NS
           1  15  0.2015E-06  0.2020E-05  0.8633E-04  0.5648E-03
           3  60  0.2141E-06  0.8111E-05  0.1243E-03  0.7641E-03
           2  60  0.1935E-06  0.1161E-04  0.2422E-03  0.7867E-03
  1   4    2  62  0.2247E-06  0.5859E-05  0.8731E-04  0.5870E-03   0.00     0.4(  1,148)   0.55NS
           1  88  0.2011E-06  0.1210E-04  0.2100E-03  0.8115E-03
  1   5    1  15  0.4181E-07  0.4808E-06  0.4723E-04  0.3551E-03   0.07     3.6(  3,146)   0.02 *
           4  15  0.2772E-06  0.3505E-05  0.9828E-04  0.6653E-03
           3  60  0.2463E-06  0.1766E-04  0.1355E-03  0.9507E-03
           2  60  0.3814E-06  0.6800E-05  0.2264E-03  0.7244E-03
  2   1    4  15  0.1195E-06  0.7534E-05  0.1056E-03  0.6131E-03   0.00     0.0(  3,146)   1.00NS
           2  60  0.1969E-06  0.1228E-04  0.1081E-03  0.7242E-03
           1  15  0.2023E-06  0.8544E-05  0.1202E-03  0.7835E-03
           3  60  0.2463E-06  0.7745E-05  0.2337E-03  0.7259E-03
  2   2    1  15  0.1113E-06  0.1228E-04  0.7853E-04  0.4869E-03   0.02     0.9(  3,146)   0.44NS
           3  60  0.1935E-06  0.4097E-05  0.9650E-04  0.7867E-03
           2  60  0.3508E-06  0.9672E-05  0.1055E-03  0.6530E-03
           4  15  0.5188E-07  0.1934E-04  0.7066E-03  0.4778E-02
  2   3    3  60  0.9699E-07  0.4985E-05  0.6131E-04  0.3301E-03   0.04     1.8(  3,146)   0.15NS
           1  15  0.2216E-06  0.2916E-05  0.1026E-03  0.8179E-03
           2  60  0.3815E-06  0.1343E-04  0.1489E-03  0.8284E-03
           4  15  0.2015E-06  0.2076E-04  0.6496E-03  0.3728E-02
  2   4    4  15  0.5964E-07  0.3011E-05  0.5832E-04  0.3765E-03   0.01     0.6(  3,146)   0.59NS
           2  60  0.3174E-06  0.1065E-04  0.1087E-03  0.6553E-03
           1  15  0.4173E-07  0.1219E-04  0.1352E-03  0.8163E-03
           3  60  0.1907E-06  0.1228E-04  0.2412E-03  0.7643E-03
  2   5    2  24  0.3278E-06  0.5167E-05  0.3571E-04  0.1483E-03   0.00     0.3(  1,148)   0.57NS
           1 126  0.1827E-06  0.1065E-04  0.1829E-03  0.7434E-03
  2   6    1   2**************************  0.5292E-05************   0.05     0.9(  8,141)   0.52NS
           4   9  0.1784E-06  0.2079E-05  0.1931E-04  0.8975E-04
           2  11  0.9594E-06  0.5194E-05  0.2524E-04  0.1031E-03
           7  20  0.2991E-06  0.6953E-05  0.7506E-04  0.2901E-03
           8  16  0.5547E-07  0.3717E-05  0.8374E-04  0.5398E-03
           6  38  0.1343E-06  0.1017E-04  0.1155E-03  0.7120E-03
           3  20  0.1894E-06  0.4223E-04  0.1488E-03  0.8095E-03
           9  12  0.2015E-06  0.5684E-04  0.1321E-03  0.8363E-03
           5  22  0.2558E-06  0.4834E-05  0.5020E-03  0.1982E-02
  2   7    2  94  0.3430E-06  0.1065E-04  0.8713E-04  0.3115E-03   0.01     0.8(  2,147)   0.47NS
           3  51  0.8742E-07  0.6038E-05  0.2719E-03  0.7252E-03
           1   5  0.6107E-06  0.3850E-03  0.3676E-03  0.7282E-03
  2   8    1  15  0.3433E-07  0.3011E-05  0.2337E-04  0.5622E-04   0.00     0.6(  1,148)   0.45NS
           2 135  0.2280E-06  0.9236E-05  0.1744E-03  0.7275E-03
  2   9    2  75  0.1253E-06  0.6495E-05  0.1136E-03  0.7855E-03   0.00     0.6(  1,148)   0.45NS
           1  75  0.3081E-06  0.1013E-04  0.2051E-03  0.6887E-03
  2  10    2  75  0.1773E-06  0.3967E-05  0.7631E-04  0.7234E-03   0.05     7.0(  1,148)   0.01**
           1  75  0.4043E-06  0.1309E-04  0.2423E-03  0.1032E-02
  2  11    4   4**************************  0.1988E-04************   0.06     3.1(  3,146)   0.03 *
           1  16  0.5537E-07  0.9111E-06  0.8241E-04  0.5007E-03
           2  80  0.2542E-06  0.5603E-05  0.9872E-04  0.6532E-03
           3  50  0.2976E-06  0.2371E-04  0.2920E-03  0.8499E-03
  2  12    2  45  0.1479E-06  0.5149E-05  0.6051E-04  0.3537E-03   0.04     1.6(  4,145)   0.19NS
           3  38  0.2725E-06  0.3617E-05  0.9640E-04  0.6664E-03
           4  22  0.1448E-06  0.1687E-04  0.1007E-03  0.4438E-03
           5  15  0.1555E-06  0.3689E-04  0.1975E-03  0.1008E-02
           1  30  0.3483E-06  0.1173E-04  0.4111E-03  0.1128E-02
  2  13    1  60  0.3577E-06  0.1307E-04  0.1119E-03  0.7233E-03   0.03     2.2(  2,147)   0.12NS
           2  75  0.1773E-06  0.4231E-05  0.1799E-03  0.5300E-03
           3  15  0.2440E-06  0.1371E-04  0.2458E-03  0.1038E-02
  2  14    2  75  0.1773E-06  0.2281E-05  0.3136E-04  0.2091E-03   0.23    43.2(  1,148)   0.00**
           1  75  0.4333E-06  0.3708E-04  0.2873E-03  0.1045E-02
  2  15    2  90  0.2191E-06  0.9672E-05  0.1046E-03  0.7231E-03   0.00     0.1(  1,148)   0.78NS
           1  60  0.1811E-06  0.6995E-05  0.2413E-03  0.7267E-03
  2  16    2  75  0.1797E-06  0.1013E-04  0.7812E-04  0.2820E-03   0.00     0.4(  1,148)   0.54NS
           1  75  0.3495E-06  0.7119E-05  0.2405E-03  0.8391E-03
  2  17    2 120  0.1811E-06  0.4985E-05  0.7870E-04  0.5875E-03   0.10    16.0(  1,148)   0.00**
           1  30  0.4808E-06  0.5344E-04  0.4818E-03  0.1119E-02
  3   1    2  74  0.1820E-06  0.5494E-05  0.6688E-04  0.2766E-03   0.04     1.8(  3,146)   0.15NS
           4   3**************************  0.9934E-04************
           3  39  0.3300E-06  0.3967E-05  0.1318E-03  0.9196E-03
```

```
          1  34  0.2081E-06  0.3257E-04  0.3974E-03  0.7909E-03
  3   2   4  15  0.2469E-06  0.1202E-04  0.7665E-04  0.4901E-03   0.00    0.2(  3,146)   0.90NS
          3  51  0.1896E-06  0.1254E-04  0.8583E-04  0.2824E-03
          1  29  0.2024E-06  0.5465E-05  0.1284E-03  0.1120E-02
          2  55  0.1113E-06  0.9236E-05  0.2663E-03  0.7248E-03
  3   3   5   7  0.1117E-06  0.2860E-05  0.1843E-04  0.1082E-03   0.02    0.7(  4,145)   0.60NS
          1  14  0.9790E-06  0.8148E-05  0.1946E-04  0.7654E-04
          4  35  0.1833E-06  0.5685E-05  0.1074E-03  0.7757E-03
          2  58  0.1805E-06  0.1343E-04  0.1459E-03  0.7735E-03
          3  36  0.3786E-06  0.1017E-04  0.3131E-03  0.6014E-03
  3   4   5   5  0.6817E-06  0.1202E-04  0.1645E-04  0.4873E-04   0.01    0.3(  4,145)   0.85NS
          1  15  0.7698E-06  0.1121E-04  0.5299E-04  0.2501E-03
          2  76  0.1856E-06  0.5305E-05  0.1035E-03  0.7248E-03
          3  30  0.1838E-06  0.1340E-04  0.1157E-03  0.7231E-03
          4  24  0.2988E-06  0.6546E-05  0.4869E-03  0.2100E-02
  3   5   1   4*************************  0.5322E-04************   0.02    0.9(  4,145)   0.48NS
          2  35  0.2098E-06  0.5149E-05  0.5689E-04  0.3518E-03
          3  46  0.2384E-06  0.9251E-05  0.6865E-04  0.3274E-03
          5  15  0.1113E-05  0.2421E-04  0.1634E-03  0.1032E-02
          4  50  0.1838E-06  0.8341E-05  0.3217E-03  0.1125E-02
  3   6   1   4*************************  0.9202E-05************   0.03    1.7(  3,146)   0.16NS
          3  76  0.1856E-06  0.6270E-05  0.8728E-04  0.6802E-03
          4  23  0.2430E-06  0.3538E-04  0.1275E-03  0.4801E-03
          2  47  0.1828E-06  0.5194E-05  0.3041E-03  0.1121E-02
  3   7   1  18  0.1347E-06  0.1920E-05  0.1139E-04  0.7413E-04   0.12    5.9(  3,146)   0.00**
          2  62  0.1955E-06  0.5434E-05  0.4067E-04  0.2691E-03
          3  55  0.3484E-06  0.2991E-04  0.1863E-03  0.1045E-02
          4  15  0.1124E-05  0.5647E-04  0.7284E-03  0.4783E-02
  3   8   2  58  0.1343E-06  0.4376E-05  0.4654E-04  0.2635E-03   0.14    7.8(  3,146)   0.00**
          1  25  0.1512E-06  0.8875E-06  0.5982E-04  0.3440E-03
          4  15  0.1898E-05  0.4810E-04  0.1575E-03  0.8226E-03
          3  52  0.4648E-06  0.1559E-04  0.3334E-03  0.1089E-02
  3   9   1  12  0.3157E-07  0.8491E-05  0.5338E-04  0.2670E-03   0.01    0.5(  3,146)   0.70NS
          4  54  0.1832E-06  0.5603E-05  0.8170E-04  0.6139E-03
          2  27  0.1376E-06  0.3505E-05  0.1066E-03  0.1125E-02
          3  57  0.3123E-06  0.1392E-04  0.2801E-03  0.7776E-03
  3  10   1   7  0.1838E-06  0.3011E-05  0.4939E-04  0.2563E-03   0.00    0.2(  3,146)   0.87NS
          2  49  0.1051E-06  0.1202E-04  0.1296E-03  0.8617E-03
          4  21  0.3453E-06  0.1934E-04  0.1517E-03  0.9372E-03
          3  73  0.3073E-06  0.5685E-05  0.1920E-03  0.5269E-03
  3  11   2  75  0.2772E-06  0.1228E-04  0.9117E-04  0.5271E-03   0.01    1.8(  1,148)   0.18NS
          1  75  0.1797E-06  0.4231E-05  0.2275E-03  0.8391E-03
  3  12   2  50  0.1784E-06  0.5356E-05  0.4745E-04  0.2682E-03   0.02    1.5(  2,147)   0.23NS
          3  50  0.1838E-06  0.6262E-05  0.1416E-03  0.8499E-03
          1  50  0.3483E-06  0.2036E-04  0.2888E-03  0.7253E-03
  3  13   1  38  0.1347E-06  0.8109E-05  0.5471E-04  0.3331E-03   0.01    0.7(  3,146)   0.55NS
          4  37  0.3123E-06  0.5685E-05  0.1113E-03  0.8052E-03
          3  38  0.1972E-06  0.8023E-05  0.1189E-03  0.6676E-03
          2  37  0.2319E-06  0.1316E-04  0.3563E-03  0.1003E-02
  3  14   4  30  0.2949E-06  0.7183E-05  0.6134E-04  0.2786E-03   0.01    0.3(  4,145)   0.88NS
          3  30  0.2038E-06  0.8322E-05  0.7792E-04  0.2686E-03
          5  30  0.1117E-06  0.4519E-05  0.1170E-03  0.8499E-03
          2  30  0.1784E-06  0.6238E-05  0.1439E-03  0.7282E-03
          1  30  0.1838E-06  0.2531E-04  0.3963E-03  0.8074E-03
  4   1   5  19  0.4487E-06  0.1228E-04  0.6232E-04  0.2741E-03   0.03    0.6(  7,142)   0.72NS
          6  19  0.2717E-06  0.1912E-05  0.7275E-04  0.5061E-03
          7  18  0.7514E-07  0.1480E-04  0.8790E-04  0.6004E-03
          2  18  0.9429E-07  0.1858E-04  0.9389E-04  0.6645E-03
          4  19  0.2417E-06  0.3565E-04  0.1123E-03  0.7245E-03
          3  19  0.3283E-06  0.1371E-04  0.1439E-03  0.9225E-03
          1  19  0.6113E-07  0.5465E-05  0.1678E-03  0.1126E-02
          8  19  0.1800E-06  0.3967E-05  0.5264E-03  0.2633E-02
NS=NOT SIGNIFICANT, *=SIGNIFICANT (P<.05), **=SIGNIFICANT (P<.01)
```

275

```
        CONSEQUENCE MEASURE:  EARLY ILLNESS
0          ISSUE GROUP =   1    ISSUE =   1    SLC FAILURE TO ACTUATE

           LEVEL 1 NO.<MED.=  8 NO. EXP.=  7     NO.>=MED.=  7 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
           LEVEL 2 NO.<MED.= 28 NO. EXP.= 30     NO.>=MED.= 32 NO. EXP.= 30   CHI-SQ.=   0.3 DF= 1 SIG.= 0.606
           LEVEL 3 NO.<MED.= 32 NO. EXP.= 30     NO.>=MED.= 28 NO. EXP.= 30   CHI-SQ.=   0.3 DF= 1 SIG.= 0.606
           LEVEL 4 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
           OVERALL CHI-SQ=   1.1 DF=  7  SIG.= 0.994

0          ISSUE GROUP =   1    ISSUE =   2    DC COMMON MODE

           LEVEL 1 NO.<MED.= 10 NO. EXP.=  7     NO.>=MED.=  5 NO. EXP.=  8   CHI-SQ.=   2.4 DF= 1 SIG.= 0.120
           LEVEL 2 NO.<MED.= 33 NO. EXP.= 30     NO.>=MED.= 27 NO. EXP.= 30   CHI-SQ.=   0.6 DF= 1 SIG.= 0.439
           LEVEL 3 NO.<MED.= 29 NO. EXP.= 30     NO.>=MED.= 31 NO. EXP.= 30   CHI-SQ.=   0.1 DF= 1 SIG.= 0.796
           LEVEL 4 NO.<MED.=  2 NO. EXP.=  7     NO.>=MED.= 13 NO. EXP.=  8   CHI-SQ.=   6.7 DF= 1 SIG.= 0.010
           OVERALL CHI-SQ=   9.8 DF=  7  SIG.= 0.202

0          ISSUE GROUP =   1    ISSUE =   3    FAILURE TO VENT

           LEVEL 1 NO.<MED.= 11 NO. EXP.=  7     NO.>=MED.=  4 NO. EXP.=  8   CHI-SQ.=   4.3 DF= 1 SIG.= 0.038
           LEVEL 2 NO.<MED.= 27 NO. EXP.= 30     NO.>=MED.= 33 NO. EXP.= 30   CHI-SQ.=   0.6 DF= 1 SIG.= 0.439
           LEVEL 3 NO.<MED.= 30 NO. EXP.= 30     NO.>=MED.= 30 NO. EXP.= 30   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
           LEVEL 4 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
           OVERALL CHI-SQ=   5.2 DF=  7  SIG.= 0.641

0          ISSUE GROUP =   1    ISSUE =   4    SW MOD A VS. MOD B

           LEVEL 1 NO.<MED.= 41 NO. EXP.= 44     NO.>=MED.= 47 NO. EXP.= 44   CHI-SQ.=   0.4 DF= 1 SIG.= 0.522
           LEVEL 2 NO.<MED.= 33 NO. EXP.= 31     NO.>=MED.= 29 NO. EXP.= 31   CHI-SQ.=   0.3 DF= 1 SIG.= 0.611
           OVERALL CHI-SQ=   0.7 DF=  3  SIG.= 0.881

0          ISSUE GROUP =   1    ISSUE =   5    POWER RECOVERY

           LEVEL 1 NO.<MED.= 12 NO. EXP.=  7     NO.>=MED.=  3 NO. EXP.=  8   CHI-SQ.=   6.7 DF= 1 SIG.= 0.010
           LEVEL 2 NO.<MED.= 32 NO. EXP.= 30     NO.>=MED.= 28 NO. EXP.= 30   CHI-SQ.=   0.3 DF= 1 SIG.= 0.606
           LEVEL 3 NO.<MED.= 21 NO. EXP.= 30     NO.>=MED.= 39 NO. EXP.= 30   CHI-SQ.=   5.4 DF= 1 SIG.= 0.020
           LEVEL 4 NO.<MED.=  9 NO. EXP.=  7     NO.>=MED.=  6 NO. EXP.=  8   CHI-SQ.=   1.1 DF= 1 SIG.= 0.301
           OVERALL CHI-SQ=  13.4 DF=  7  SIG.= 0.062

0          ISSUE GROUP =   2    ISSUE =   1    PROB. OF STUCK OPEN VAC. BRKR.

           LEVEL 1 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
           LEVEL 2 NO.<MED.= 29 NO. EXP.= 30     NO.>=MED.= 31 NO. EXP.= 30   CHI-SQ.=   0.1 DF= 1 SIG.= 0.796
           LEVEL 3 NO.<MED.= 30 NO. EXP.= 30     NO.>=MED.= 30 NO. EXP.= 30   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
           LEVEL 4 NO.<MED.=  8 NO. EXP.=  7     NO.>=MED.=  7 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
           OVERALL CHI-SQ=   0.3 DF=  7  SIG.= 1.000

0          ISSUE GROUP =   2    ISSUE =   2    HPSW-SPRAY

           LEVEL 1 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
```

```
     LEVEL 2 NO.<MED.= 28 NO. EXP.= 30     NO.>=MED.= 32 NO. EXP.= 30   CHI-SQ.=    0.3 DF= 1 SIG.= 0.606
     LEVEL 3 NO.<MED.= 33 NO. EXP.= 30     NO.>=MED.= 27 NO. EXP.= 30   CHI-SQ.=    0.6 DF= 1 SIG.= 0.439
     LEVEL 4 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8   CHI-SQ.=    0.3 DF= 1 SIG.= 0.605
     OVERALL CHI-SQ=   1.1 DF=  7  SIG.= 0.992

0    ISSUE GROUP =   2   ISSUE =   3   VENT-SBO-NACR

     LEVEL 1 NO.<MED.=  9 NO. EXP.=  7     NO.>=MED.=  6 NO. EXP.=  8   CHI-SQ.=    1.1 DF= 1 SIG.= 0.301
     LEVEL 2 NO.<MED.= 27 NO. EXP.= 30     NO.>=MED.= 33 NO. EXP.= 30   CHI-SQ.=    0.6 DF= 1 SIG.= 0.439
     LEVEL 3 NO.<MED.= 33 NO. EXP.= 30     NO.>=MED.= 27 NO. EXP.= 30   CHI-SQ.=    0.6 DF= 1 SIG.= 0.439
     LEVEL 4 NO.<MED.=  5 NO. EXP.=  7     NO.>=MED.= 10 NO. EXP.=  8   CHI-SQ.=    1.1 DF= 1 SIG.= 0.301
     OVERALL CHI-SQ=   3.3 DF=  7  SIG.= 0.852

0    ISSUE GROUP =   2   ISSUE =   4   VENT-SBO-ACR

     LEVEL 1 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8   CHI-SQ.=    0.3 DF= 1 SIG.= 0.605
     LEVEL 2 NO.<MED.= 28 NO. EXP.= 30     NO.>=MED.= 32 NO. EXP.= 30   CHI-SQ.=    0.3 DF= 1 SIG.= 0.606
     LEVEL 3 NO.<MED.= 29 NO. EXP.= 30     NO.>=MED.= 31 NO. EXP.= 30   CHI-SQ.=    0.1 DF= 1 SIG.= 0.796
     LEVEL 4 NO.<MED.= 11 NO. EXP.=  7     NO.>=MED.=  4 NO. EXP.=  8   CHI-SQ.=    4.3 DF= 1 SIG.= 0.038
     OVERALL CHI-SQ=   4.9 DF=  7  SIG.= 0.674

0    ISSUE GROUP =   2   ISSUE =   5   SP BYPASS, SMALL/LARGE

     LEVEL 1 NO.<MED.= 61 NO. EXP.= 63     NO.>=MED.= 65 NO. EXP.= 63   CHI-SQ.=    0.1 DF= 1 SIG.= 0.722
     LEVEL 2 NO.<MED.= 13 NO. EXP.= 12     NO.>=MED.= 11 NO. EXP.= 12   CHI-SQ.=    0.2 DF= 1 SIG.= 0.683
     OVERALL CHI-SQ=   0.3 DF=  3  SIG.= 0.961

0    ISSUE GROUP =   2   ISSUE =   6   CONT FAILURE PRESS. (T<500F B VB)

     LEVEL 1 NO.<MED.=  1 NO. EXP.=  1     NO.>=MED.=  1 NO. EXP.=  1  TEST CANNOT BE RUN; EXP. NO. < 3
     LEVEL 2 NO.<MED.=  6 NO. EXP.=  5     NO.>=MED.=  5 NO. EXP.=  6   CHI-SQ.=    0.4 DF= 1 SIG.= 0.545
     LEVEL 3 NO.<MED.=  6 NO. EXP.= 10     NO.>=MED.= 14 NO. EXP.= 10   CHI-SQ.=    3.2 DF= 1 SIG.= 0.074
     LEVEL 4 NO.<MED.=  6 NO. EXP.=  4     NO.>=MED.=  3 NO. EXP.=  5   CHI-SQ.=    0.0 DF= 1 SIG.= 1.000
     LEVEL 5 NO.<MED.= 12 NO. EXP.= 11     NO.>=MED.= 10 NO. EXP.= 11   CHI-SQ.=    0.2 DF= 1 SIG.= 0.670
     LEVEL 6 NO.<MED.= 18 NO. EXP.= 19     NO.>=MED.= 20 NO. EXP.= 19   CHI-SQ.=    0.1 DF= 1 SIG.= 0.746
     LEVEL 7 NO.<MED.= 10 NO. EXP.= 10     NO.>=MED.= 10 NO. EXP.= 10   CHI-SQ.=    0.0 DF= 1 SIG.= 1.000
     LEVEL 8 NO.<MED.= 11 NO. EXP.=  8     NO.>=MED.=  5 NO. EXP.=  8   CHI-SQ.=    2.3 DF= 1 SIG.= 0.134
     LEVEL 9 NO.<MED.=  4 NO. EXP.=  6     NO.>=MED.=  8 NO. EXP.=  6   CHI-SQ.=    1.3 DF= 1 SIG.= 0.248
     OVERALL CHI-SQ=   7.4 DF= 15  SIG.= 0.944

0    ISSUE GROUP =   2   ISSUE =   7   LATE FAILURE LOCATION (800-1200 A VB)

     LEVEL 1 NO.<MED.=  2 NO. EXP.=  2     NO.>=MED.=  3 NO. EXP.=  3   TEST CANNOT BE RUN; EXP. NO. < 3
     LEVEL 2 NO.<MED.= 45 NO. EXP.= 47     NO.>=MED.= 49 NO. EXP.= 47   CHI-SQ.=    0.2 DF= 1 SIG.= 0.680
     LEVEL 3 NO.<MED.= 27 NO. EXP.= 25     NO.>=MED.= 24 NO. EXP.= 26   CHI-SQ.=    0.3 DF= 1 SIG.= 0.575
     OVERALL CHI-SQ=   0.5 DF=  3  SIG.= 0.922

0    ISSUE GROUP =   2   ISSUE =   8   CONT FAILURE SIZE, RAPID PRESS.
```

```
     LEVEL 1 NO.<MED.=  8 NO. EXP.=  7     NO.>=MED.=  7 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
     LEVEL 2 NO.<MED.= 66 NO. EXP.= 67     NO.>=MED.= 69 NO. EXP.= 68   CHI-SQ.=   0.0 DF= 1 SIG.= 0.863
     OVERALL CHI-SQ=   0.3 DF=  3  SIG.= 0.961

0    ISSUE GROUP =   2   ISSUE =   9   CONT FAILURE SIZE, SLOW PRESS.

     LEVEL 1 NO.<MED.= 36 NO. EXP.= 37     NO.>=MED.= 39 NO. EXP.= 38   CHI-SQ.=   0.1 DF= 1 SIG.= 0.817
     LEVEL 2 NO.<MED.= 38 NO. EXP.= 37     NO.>=MED.= 37 NO. EXP.= 38   CHI-SQ.=   0.1 DF= 1 SIG.= 0.817
     OVERALL CHI-SQ=   0.1 DF=  3  SIG.= 0.991

0    ISSUE GROUP =   2   ISSUE =  10   VB MODE, HIGH-P FLOW MELT

     LEVEL 1 NO.<MED.= 32 NO. EXP.= 37     NO.>=MED.= 43 NO. EXP.= 38   CHI-SQ.=   1.3 DF= 1 SIG.= 0.248
     LEVEL 2 NO.<MED.= 42 NO. EXP.= 37     NO.>=MED.= 33 NO. EXP.= 38   CHI-SQ.=   1.3 DF= 1 SIG.= 0.248
     OVERALL CHI-SQ=   2.7 DF=  3  SIG.= 0.446

0    ISSUE GROUP =   2   ISSUE =  11   CONT PRESS. BEFORE VB, LONG TERM TB

     LEVEL 1 NO.<MED.= 12 NO. EXP.=  8     NO.>=MED.=  4 NO. EXP.=  8   CHI-SQ.=   4.0 DF= 1 SIG.= 0.046
     LEVEL 2 NO.<MED.= 43 NO. EXP.= 40     NO.>=MED.= 37 NO. EXP.= 40   CHI-SQ.=   0.4 DF= 1 SIG.= 0.502
     LEVEL 3 NO.<MED.= 16 NO. EXP.= 25     NO.>=MED.= 34 NO. EXP.= 25   CHI-SQ.=   6.5 DF= 1 SIG.= 0.011
     LEVEL 4 NO.<MED.=  3 NO. EXP.=  2     NO.>=MED.=  1 NO. EXP.=  2   TEST CANNOT BE RUN; EXP. NO. < 3
     OVERALL CHI-SQ=  10.9 DF=  5  SIG.= 0.053

0    ISSUE GROUP =   2   ISSUE =  12   PRESSURE RISE AT VB

     LEVEL 1 NO.<MED.= 13 NO. EXP.= 15     NO.>=MED.= 17 NO. EXP.= 15   CHI-SQ.=   0.5 DF= 1 SIG.= 0.465
     LEVEL 2 NO.<MED.= 26 NO. EXP.= 22     NO.>=MED.= 19 NO. EXP.= 23   CHI-SQ.=   1.4 DF= 1 SIG.= 0.233
     LEVEL 3 NO.<MED.= 22 NO. EXP.= 19     NO.>=MED.= 16 NO. EXP.= 19   CHI-SQ.=   0.9 DF= 1 SIG.= 0.330
     LEVEL 4 NO.<MED.=  9 NO. EXP.= 11     NO.>=MED.= 13 NO. EXP.= 11   CHI-SQ.=   0.7 DF= 1 SIG.= 0.394
     LEVEL 5 NO.<MED.=  4 NO. EXP.=  7     NO.>=MED.= 11 NO. EXP.=  8   CHI-SQ.=   2.4 DF= 1 SIG.= 0.120
     OVERALL CHI-SQ=   6.0 DF=  9  SIG.= 0.736

0    ISSUE GROUP =   2   ISSUE =  13   DELTA P DUE TO SUMP WATER INTERACT.

     LEVEL 1 NO.<MED.= 26 NO. EXP.= 30     NO.>=MED.= 34 NO. EXP.= 30   CHI-SQ.=   1.1 DF= 1 SIG.= 0.302
     LEVEL 2 NO.<MED.= 43 NO. EXP.= 37     NO.>=MED.= 32 NO. EXP.= 38   CHI-SQ.=   1.9 DF= 1 SIG.= 0.166
     LEVEL 3 NO.<MED.=  5 NO. EXP.=  7     NO.>=MED.= 10 NO. EXP.=  8   CHI-SQ.=   1.1 DF= 1 SIG.= 0.301
     OVERALL CHI-SQ=   4.1 DF=  5  SIG.= 0.541

0    ISSUE GROUP =   2   ISSUE =  14   PROB OF DRY DW MELT THROUGH

     LEVEL 1 NO.<MED.= 22 NO. EXP.= 37     NO.>=MED.= 53 NO. EXP.= 38   CHI-SQ.=  12.0 DF= 1 SIG.= 0.001
     LEVEL 2 NO.<MED.= 52 NO. EXP.= 37     NO.>=MED.= 23 NO. EXP.= 38   CHI-SQ.=  12.0 DF= 1 SIG.= 0.001
     OVERALL CHI-SQ=  24.0 DF=  3  SIG.= 0.000

0    ISSUE GROUP =   2   ISSUE =  15   PROB OF WET DW MELT THROUGH

     LEVEL 1 NO.<MED.= 31 NO. EXP.= 30     NO.>=MED.= 29 NO. EXP.= 30   CHI-SQ.=   0.1 DF= 1 SIG.= 0.796
     LEVEL 2 NO.<MED.= 43 NO. EXP.= 45     NO.>=MED.= 47 NO. EXP.= 45   CHI-SQ.=   0.2 DF= 1 SIG.= 0.673
```

```
        OVERALL CHI-SQ=   0.2 DF=  3  SIG.= 0.970

 0      ISSUE GROUP =   2   ISSUE =  16   PROB OF DW M-THRU W/HI-P MELT EJECT

        LEVEL 1 NO.<MED.= 38 NO. EXP.= 37      NO.>=MED.= 37 NO. EXP.= 38   CHI-SQ.=   0.1 DF= 1 SIG.= 0.817
        LEVEL 2 NO.<MED.= 36 NO. EXP.= 37      NO.>=MED.= 39 NO. EXP.= 38   CHI-SQ.=   0.1 DF= 1 SIG.= 0.817
        OVERALL CHI-SQ=   0.1 DF=  3  SIG.= 0.991

 0      ISSUE GROUP =   2   ISSUE =  17   PROB OF H2 BURNS IN RB LEADING TO BP

        LEVEL 1 NO.<MED.=  7 NO. EXP.= 15      NO.>=MED.= 23 NO. EXP.= 15   CHI-SQ.=   8.5 DF= 1 SIG.= 0.003
        LEVEL 2 NO.<MED.= 67 NO. EXP.= 60      NO.>=MED.= 53 NO. EXP.= 60   CHI-SQ.=   1.6 DF= 1 SIG.= 0.201
        OVERALL CHI-SQ=  10.2 DF=  3  SIG.= 0.017

 0      ISSUE GROUP =   3   ISSUE =   1   IN-VES RELEASE FROM FUEL

        LEVEL 1 NO.<MED.= 12 NO. EXP.= 17      NO.>=MED.= 22 NO. EXP.= 17   CHI-SQ.=   2.9 DF= 1 SIG.= 0.086
        LEVEL 2 NO.<MED.= 38 NO. EXP.= 37      NO.>=MED.= 36 NO. EXP.= 37   CHI-SQ.=   0.1 DF= 1 SIG.= 0.816
        LEVEL 3 NO.<MED.= 24 NO. EXP.= 19      NO.>=MED.= 15 NO. EXP.= 20   CHI-SQ.=   2.6 DF= 1 SIG.= 0.109
        LEVEL 4 NO.<MED.=  0 NO. EXP.=  1      NO.>=MED.=  3 NO. EXP.=  2   TEST CANNOT BE RUN; EXP. NO. < 3
        OVERALL CHI-SQ=   5.6 DF=  5  SIG.= 0.351

 0      ISSUE GROUP =   3   ISSUE =   2   CSI DECOMP

        LEVEL 1 NO.<MED.= 16 NO. EXP.= 14      NO.>=MED.= 13 NO. EXP.= 15   CHI-SQ.=   0.6 DF= 1 SIG.= 0.457
        LEVEL 2 NO.<MED.= 27 NO. EXP.= 27      NO.>=MED.= 28 NO. EXP.= 28   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
        LEVEL 3 NO.<MED.= 24 NO. EXP.= 25      NO.>=MED.= 27 NO. EXP.= 26   CHI-SQ.=   0.1 DF= 1 SIG.= 0.779
        LEVEL 4 NO.<MED.=  7 NO. EXP.=  7      NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
        OVERALL CHI-SQ=   0.6 DF=  7  SIG.= 0.999

 0      ISSUE GROUP =   3   ISSUE =   3   FRAC IN-VES RETENTION LEAKED, AT VB

        LEVEL 1 NO.<MED.=  7 NO. EXP.=  7      NO.>=MED.=  7 NO. EXP.=  7   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
        LEVEL 2 NO.<MED.= 25 NO. EXP.= 29      NO.>=MED.= 33 NO. EXP.= 29   CHI-SQ.=   1.1 DF= 1 SIG.= 0.293
        LEVEL 3 NO.<MED.= 17 NO. EXP.= 18      NO.>=MED.= 19 NO. EXP.= 18   CHI-SQ.=   0.1 DF= 1 SIG.= 0.739
        LEVEL 4 NO.<MED.= 20 NO. EXP.= 17      NO.>=MED.= 15 NO. EXP.= 18   CHI-SQ.=   1.0 DF= 1 SIG.= 0.310
        LEVEL 5 NO.<MED.=  5 NO. EXP.=  3      NO.>=MED.=  2 NO. EXP.=  4   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
        OVERALL CHI-SQ=   2.2 DF=  9  SIG.= 0.987

 0      ISSUE GROUP =   3   ISSUE =   4   S POOL DF

        LEVEL 1 NO.<MED.=  6 NO. EXP.=  7      NO.>=MED.=  9 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
        LEVEL 2 NO.<MED.= 41 NO. EXP.= 38      NO.>=MED.= 35 NO. EXP.= 38   CHI-SQ.=   0.5 DF= 1 SIG.= 0.491
        LEVEL 3 NO.<MED.= 14 NO. EXP.= 15      NO.>=MED.= 16 NO. EXP.= 15   CHI-SQ.=   0.1 DF= 1 SIG.= 0.715
        LEVEL 4 NO.<MED.= 12 NO. EXP.= 12      NO.>=MED.= 12 NO. EXP.= 12   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
        LEVEL 5 NO.<MED.=  1 NO. EXP.=  2      NO.>=MED.=  4 NO. EXP.=  3   TEST CANNOT BE RUN; EXP. NO. < 3
        OVERALL CHI-SQ=   0.9 DF=  7  SIG.= 0.997

 0      ISSUE GROUP =   3   ISSUE =   5   S POOL DF, VOL I
```

279

```
     LEVEL 1 NO.<MED.=  2 NO. EXP.=  2     NO.>=MED.=  2 NO. EXP.=  2  TEST CANNOT BE RUN; EXP. NO. < 3
     LEVEL 2 NO.<MED.= 20 NO. EXP.= 17     NO.>=MED.= 15 NO. EXP.= 18   CHI-SQ.=   1.0 DF= 1 SIG.= 0.310
     LEVEL 3 NO.<MED.= 23 NO. EXP.= 23     NO.>=MED.= 23 NO. EXP.= 23   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 4 NO.<MED.= 25 NO. EXP.= 25     NO.>=MED.= 25 NO. EXP.= 25   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 5 NO.<MED.=  4 NO. EXP.=  7     NO.>=MED.= 11 NO. EXP.=  8   CHI-SQ.=   2.4 DF= 1 SIG.= 0.120
     OVERALL CHI-SQ=   3.4 DF=  7  SIG.= 0.842

0    ISSUE GROUP =   3   ISSUE =   6   REVOL FROM RPV (FRVOL)

     LEVEL 1 NO.<MED.=  2 NO. EXP.=  2     NO.>=MED.=  2 NO. EXP.=  2   TEST CANNOT BE RUN; EXP. NO. < 3
     LEVEL 2 NO.<MED.= 27 NO. EXP.= 23     NO.>=MED.= 20 NO. EXP.= 24   CHI-SQ.=   1.4 DF= 1 SIG.= 0.243
     LEVEL 3 NO.<MED.= 39 NO. EXP.= 38     NO.>=MED.= 37 NO. EXP.= 38   CHI-SQ.=   0.1 DF= 1 SIG.= 0.819
     LEVEL 4 NO.<MED.=  6 NO. EXP.= 11     NO.>=MED.= 17 NO. EXP.= 12   CHI-SQ.=   4.4 DF= 1 SIG.= 0.037
     OVERALL CHI-SQ=   5.8 DF=  5  SIG.= 0.329

0    ISSUE GROUP =   3   ISSUE =   7   CCI REL

     LEVEL 1 NO.<MED.= 13 NO. EXP.=  9     NO.>=MED.=  5 NO. EXP.=  9   CHI-SQ.=   3.6 DF= 1 SIG.= 0.059
     LEVEL 2 NO.<MED.= 35 NO. EXP.= 31     NO.>=MED.= 27 NO. EXP.= 31   CHI-SQ.=   1.0 DF= 1 SIG.= 0.310
     LEVEL 3 NO.<MED.= 21 NO. EXP.= 27     NO.>=MED.= 34 NO. EXP.= 28   CHI-SQ.=   2.6 DF= 1 SIG.= 0.106
     LEVEL 4 NO.<MED.=  5 NO. EXP.=  7     NO.>=MED.= 10 NO. EXP.=  8   CHI-SQ.=   1.1 DF= 1 SIG.= 0.301
     OVERALL CHI-SQ=   8.3 DF=  7  SIG.= 0.309

0    ISSUE GROUP =   3   ISSUE =   8   RB DF

     LEVEL 1 NO.<MED.= 18 NO. EXP.= 12     NO.>=MED.=  7 NO. EXP.= 13   CHI-SQ.=   5.8 DF= 1 SIG.= 0.016
     LEVEL 2 NO.<MED.= 32 NO. EXP.= 29     NO.>=MED.= 26 NO. EXP.= 29   CHI-SQ.=   0.6 DF= 1 SIG.= 0.431
     LEVEL 3 NO.<MED.= 20 NO. EXP.= 26     NO.>=MED.= 32 NO. EXP.= 26   CHI-SQ.=   2.8 DF= 1 SIG.= 0.096
     LEVEL 4 NO.<MED.=  4 NO. EXP.=  7     NO.>=MED.= 11 NO. EXP.=  8   CHI-SQ.=   2.4 DF= 1 SIG.= 0.120
     OVERALL CHI-SQ=  11.6 DF=  7  SIG.= 0.116

0    ISSUE GROUP =   3   ISSUE =   9   REF BAY DF

     LEVEL 1 NO.<MED.=  6 NO. EXP.=  6     NO.>=MED.=  6 NO. EXP.=  6   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 2 NO.<MED.= 15 NO. EXP.= 13     NO.>=MED.= 12 NO. EXP.= 14   CHI-SQ.=   0.6 DF= 1 SIG.= 0.441
     LEVEL 3 NO.<MED.= 24 NO. EXP.= 28     NO.>=MED.= 33 NO. EXP.= 29   CHI-SQ.=   1.1 DF= 1 SIG.= 0.289
     LEVEL 4 NO.<MED.= 29 NO. EXP.= 27     NO.>=MED.= 25 NO. EXP.= 27   CHI-SQ.=   0.3 DF= 1 SIG.= 0.586
     OVERALL CHI-SQ=   2.0 DF=  7  SIG.= 0.959

0    ISSUE GROUP =   3   ISSUE =  10   LATE RELEASE FRACT, IODINE

     LEVEL 1 NO.<MED.=  4 NO. EXP.=  3     NO.>=MED.=  3 NO. EXP.=  4   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 2 NO.<MED.= 23 NO. EXP.= 24     NO.>=MED.= 26 NO. EXP.= 25   CHI-SQ.=   0.1 DF= 1 SIG.= 0.775
     LEVEL 3 NO.<MED.= 38 NO. EXP.= 36     NO.>=MED.= 35 NO. EXP.= 37   CHI-SQ.=   0.2 DF= 1 SIG.= 0.640
     LEVEL 4 NO.<MED.=  9 NO. EXP.= 10     NO.>=MED.= 12 NO. EXP.= 11   CHI-SQ.=   0.2 DF= 1 SIG.= 0.662
     OVERALL CHI-SQ=   0.5 DF=  7  SIG.= 0.999

0
```

CONSEQUENCE MEASURE:
IND.RISK OF FATALITY

BASE CASE :
PEACH BOTTOM LLH (CRAC2)

ISSUE LEVELS FOR EACH SAMPLE MEMBER, IN ORDER OF INCREASING RISK

RISK	ISSUE LEVELS, FOR ALL ISSUES																														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1.828E-11	3	2	3	2	3	2	4	3	1	1	8	3	1	2	2	3	4	2	2	2	1	2	2	2	4	2	2	2	2	2	1	2
1.859E-11	2	2	2	2	2	2	3	3	3	1	8	2	2	1	1	2	2	1	2	2	1	2	1	2	1	2	3	2	1	1	4	3
2.160E-11	3	2	2	1	3	3	3	2	3	1	5	3	2	2	2	1	2	3	2	2	2	2	2	1	4	2	4	3	2	2	4	1
2.343E-11	2	2	2	1	1	2	3	3	4	1	6	3	2	2	2	1	2	1	2	2	2	2	2	2	2	2	4	3	3	2	2	2
2.933E-11	2	1	2	2	1	4	1	3	3	1	3	3	1	2	2	2	2	2	2	1	2	2	1	2	2	3	4	3	2	1	4	3
4.011E-11	2	2	3	1	1	3	2	3	2	1	6	2	2	2	1	3	5	2	1	1	1	2	2	3	5	4	3	3	1	2	4	2
5.436E-11	2	2	2	2	2	2	2	2	3	1	6	2	2	1	1	1	1	1	2	2	1	2	2	1	2	4	2	3	3	2	1	3
5.731E-11	3	3	2	2	3	3	3	1	1	1	9	3	2	1	1	1	3	2	2	1	2	2	1	3	2	3	4	2	2	1	2	1
6.495E-11	2	2	2	1	2	2	2	3	3	1	9	2	2	2	1	2	4	2	2	2	2	2	1	2	4	5	4	2	2	2	4	3
7.316E-11	3	3	3	1	1	1	2	2	3	1	4	3	2	1	2	2	2	2	2	1	2	2	3	1	2	2	2	3	1	2	4	3
7.897E-11	3	3	2	1	1	2	3	3	2	1	6	2	2	1	2	2	2	2	2	2	2	2	2	4	3	2	4	4	1	1	1	2
7.939E-11	2	2	2	2	2	1	3	3	2	1	6	3	2	2	2	2	2	2	1	2	2	2	2	2	4	2	4	2	2	2	3	3
9.921E-11	2	1	3	2	2	4	3	2	2	1	7	2	2	1	2	1	3	1	1	1	2	1	3	1	2	4	1	2	2	2	4	3
1.002E-10	2	2	3	2	3	4	2	3	3	1	6	2	2	1	2	4	1	2	2	2	1	1	2	4	2	2	3	2	1	2	3	2
1.005E-10	3	2	3	2	1	2	3	2	2	1	7	2	2	2	1	3	1	2	2	1	1	1	3	3	2	2	1	2	2	2	4	3
1.066E-10	2	2	3	2	2	3	3	4	4	1	6	2	2	2	1	1	2	2	2	2	2	2	2	3	2	2	3	3	3	1	3	4
1.151E-10	1	2	2	2	2	2	3	2	2	1	4	3	2	2	1	3	2	2	1	2	1	2	2	1	3	1	2	3	4	3	4	2
1.169E-10	2	2	2	1	2	4	3	3	2	1	8	2	2	2	2	3	2	1	2	2	1	2	3	1	3	2	4	4	3	1	3	4
1.189E-10	2	2	2	1	4	2	2	3	2	1	7	3	2	1	2	1	1	2	2	2	1	2	2	3	4	2	3	3	3	2	4	4
1.203E-10	1	2	2	1	2	2	3	3	3	1	5	2	2	2	1	2	4	1	2	1	2	1	4	4	1	5	3	3	3	2	1	2
1.210E-10	3	3	1	1	1	2	3	4	3	1	6	2	2	2	2	2	1	2	2	2	2	2	2	3	4	2	3	2	3	2	2	3
1.279E-10	1	1	3	1	2	3	4	2	2	1	3	3	2	1	2	2	2	1	1	2	1	2	2	1	2	2	2	2	3	3	3	3
1.285E-10	1	3	3	2	1	3	2	2	3	2	3	2	2	1	2	3	3	1	1	1	2	2	2	4	4	2	2	3	3	1	3	2
1.302E-10	2	3	3	2	2	2	2	2	2	1	2	3	2	1	2	3	2	2	2	2	2	2	2	2	5	2	2	3	4	2	2	3
1.316E-10	1	1	3	2	2	3	4	2	2	1	2	2	2	2	2	1	3	2	1	2	1	1	2	2	3	3	3	2	2	3	2	3
1.347E-10	2	1	3	2	2	1	2	3	4	1	5	2	2	2	1	2	2	3	1	2	2	2	2	3	1	2	3	3	4	2	4	2
1.375E-10	2	2	2	1	2	3	1	3	3	1	3	2	2	2	1	3	2	2	2	2	1	2	1	3	3	2	2	2	3	4	3	3
1.378E-10	2	2	3	2	2	3	4	2	2	1	9	3	2	2	1	3	3	2	1	1	1	2	1	1	4	3	4	2	2	4	1	2
1.384E-10	3	2	1	1	3	1	1	3	4	1	9	2	2	2	2	2	4	2	2	2	1	2	2	2	2	4	2	3	2	3	3	2
1.433E-10	3	2	3	1	3	4	3	2	2	2	8	2	2	1	2	2	2	1	2	1	2	2	1	3	5	3	2	3	1	3	3	4
1.464E-10	3	3	2	1	2	2	2	3	2	1	6	2	2	1	2	2	1	1	2	1	2	2	1	2	2	2	3	3	2	3	3	2
1.518E-10	3	2	1	2	3	2	3	2	3	1	2	3	1	1	2	3	3	1	2	2	2	2	2	3	1	2	2	3	2	3	3	3
1.518E-10	4	3	3	1	3	2	3	1	3	2	6	3	2	2	2	3	3	1	2	2	2	2	1	1	3	2	2	2	3	2	2	2
1.598E-10	1	3	3	1	2	3	2	1	3	1	6	2	2	2	2	3	5	3	2	1	1	2	2	4	4	3	4	3	3	1	1	3
1.645E-10	2	3	1	1	3	3	3	4	3	2	5	2	2	1	2	3	3	2	1	2	2	2	3	2	4	2	3	3	2	1	3	2
1.645E-10	2	3	3	1	1	3	2	3	3	2	7	2	2	2	1	2	2	2	2	2	1	2	2	3	4	1	3	3	2	3	4	3
1.722E-10	3	3	1	2	2	3	2	2	1	1	6	1	1	1	1	4	3	2	2	2	2	2	2	1	3	1	4	2	1	3	4	2
1.738E-10	3	1	3	2	4	2	1	3	3	1	7	3	2	2	2	1	3	1	2	1	1	2	2	2	2	2	3	4	2	2	3	2
1.753E-10	3	2	1	2	3	3	3	3	3	2	5	2	2	1	1	2	5	2	2	2	1	2	2	2	2	2	3	2	2	2	2	3
1.754E-10	1	1	2	1	2	2	4	2	2	2	6	2	2	2	1	2	4	1	1	1	2	2	2	3	4	3	4	4	4	4	3	3
1.778E-10	3	3	4	2	2	3	2	3	2	1	7	2	1	1	1	2	1	2	2	1	1	2	2	4	3	2	2	1	2	3	2	3
1.788E-10	2	2	2	2	2	3	3	2	2	1	9	2	2	2	1	2	3	2	1	2	2	2	2	3	1	3	5	3	3	3	4	4
1.862E-10	1	3	2	1	3	3	4	2	3	1	3	3	2	1	2	2	2	3	2	2	2	2	2	1	2	2	3	2	1	3	3	2
1.867E-10	3	2	1	1	2	2	3	2	1	1	1	3	2	1	1	1	2	1	1	2	1	2	2	4	3	4	4	3	2	1	3	3
2.040E-10	2	3	2	1	2	4	3	2	3	2	6	2	2	1	1	2	1	1	2	1	2	2	1	3	4	1	4	4	2	2	3	2
2.092E-10	3	3	1	1	2	3	4	3	3	1	3	3	2	2	1	2	2	1	1	2	1	2	2	2	2	2	2	3	3	1	4	3
2.119E-10	2	2	4	1	4	2	3	3	3	1	6	2	2	2	1	3	2	2	2	2	1	2	1	1	2	2	2	3	2	1	4	3
2.152E-10	3	2	2	1	2	4	2	3	3	1	8	3	2	1	2	2	1	1	1	2	2	2	3	1	4	3	4	3	3	2	3	3
2.251E-10	3	2	3	1	1	3	3	4	2	1	5	3	2	1	1	2	3	2	1	2	1	2	3	3	1	2	3	3	1	3	4	3
2.282E-10	2	1	2	2	3	3	2	1	2	2	6	2	2	1	1	2	3	1	2	2	2	2	2	2	3	1	4	2	3	3	3	1
2.283E-10	3	1	2	1	2	3	1	4	2	1	2	2	2	1	1	2	3	2	2	1	2	1	2	1	2	2	3	2	2	2	2	4
2.287E-10	3	2	4	1	3	3	3	2	3	2	2	2	2	2	1	3	3	1	2	2	1	2	3	1	4	3	5	1	2	3	4	3
2.365E-10	2	1	3	1	3	1	3	3	3	1	3	2	2	2	1	2	4	1	2	2	1	1	1	1	3	2	5	4	2	1	2	3
2.439E-10	3	2	3	1	3	2	2	2	2	1	3	2	2	2	2	3	3	2	2	2	1	2	2	3	4	2	1	4	3	3	3	3
2.483E-10	4	2	3	2	2	3	3	1	2	2	7	2	2	2	1	2	1	2	2	2	1	2	2	3	3	3	2	3	3	1	4	3
2.489E-10	3	2	2	1	2	3	3	2	3	1	9	2	2	1	1	2	1	2	1	2	2	1	1	4	4	2	3	3	3	2	3	2
2.503E-10	3	2	2	1	3	3	3	4	2	1	6	2	2	1	2	3	1	2	1	1	1	2	3	3	3	1	5	3	3	1	3	4
2.672E-10	3	1	2	2	1	2	1	2	1	1	8	3	2	1	2	3	4	2	2	2	1	2	3	2	3	1	2	2	4	4	4	3
2.771E-10	2	3	1	2	3	3	2	3	2	1	4	2	2	2	1	2	2	2	2	1	1	2	3	3	2	3	3	3	4	1	3	2
2.805E-10	2	2	2	1	3	4	3	2	2	1	6	3	2	2	2	3	5	2	1	1	2	2	1	4	2	2	2	3	2	2	4	3
2.875E-10	1	3	2	1	2	2	2	3	2	1	8	2	2	1	1	2	2	1	2	2	1	2	3	2	3	2	3	3	2	3	1	2
2.890E-10	3	2	3	1	2	2	3	3	4	1	6	2	2	2	1	4	4	2	2	1	2	2	3	3	3	2	3	2	3	2	3	4
3.030E-10	2	1	4	1	3	2	3	1	3	1	6	2	2	2	2	2	2	3	1	2	2	2	2	3	2	2	3	3	1	3	2	3
3.063E-10	2	3	2	1	2	1	2	3	1	1	5	3	2	2	1	2	1	1	2	2	1	2	2	1	2	5	2	4	1	2	2	2
3.125E-10	3	2	2	1	3	2	3	3	4	1	7	2	1	1	1	2	3	2	2	2	2	2	3	3	4	4	2	3	3	3	3	1
3.130E-10	2	3	2	2	3	2	2	2	2	1	4	1	2	2	2	1	3	2	2	1	1	2	2	1	4	2	2	3	2	2	3	4
3.324E-10	3	2	2	1	3	1	2	2	2	1	9	2	2	2	1	3	1	3	2	1	2	2	2	3	2	3	3	4	2	3	4	3
3.434E-10	2	2	3	2	3	1	2	2	3	1	8	2	2	1	1	2	4	1	1	1	2	1	2	1	2	2	4	4	3	1	3	3
3.746E-10	2	3	3	1	3	3	2	1	1	1	7	2	2	1	1	2	2	2	2	2	2	2	2	2	1	1	3	3	3	2	3	3
3.786E-10	2	2	1	1	3	2	2	4	1	1	6	2	2	2	2	3	3	1	1	1	2	2	2	3	2	2	2	3	4	3	3	3
4.021E-10	1	3	3	2	3	2	3	3	4	1	7	3	2	2	2	2	2	2	1	1	2	2	3	2	3	2	4	2	2	2	2	2
4.038E-10	1	2	2	2	4	3	2	3	3	1	8	2	2	1	1	2	3	3	2	2	1	2	3	3	4	1	4	2	2	2	4	2
4.170E-10	2	2	2	2	3	1	1	3	1	1	2	2	2	1	1	3	3	1	1	2	2	2	1	2	3	2	2	3	2	4	4	2
4.480E-10	1	2	3	1	3	2	3	2	2	1	6	2	2	1	1	2	1	2	1	1	2	2	4	3	2	1	4	4	3	4	1	2
4.622E-10	2	1	4	1	4	2	3	2	2	1	4	3	2	2	2	2	3	1	2	1	1	2	2	4	3	2	4	4	2	3	4	3
4.643E-10	3	3	2	1	2	1	2	3	3	1	2	2	2	2	2	2	3	2	2	1	1	2	1	2	3	3	4	3	2	4	4	3

```
4.689E-10  3  2  3  1  3  3  4  4  3  1  7  2  2  2  1  3  2  1  1  1  1   2  4  3  2  3  2  3  3  3  4  2
4.786E-10  3  1  4  1  3  3  2  4  3  1  8  3  2  1  1  3  5  1  1  2  2   1  2  1  2  3  3  4  3  2  1  1
5.007E-10  4  3  3  1  2  3  3  3  2  1  6  2  2  1  2  2  2  1  2  1  2   2  2  3  3  4  2  3  3  2  2  3
5.074E-10  4  2  1  2  3  4  4  2  2  1  6  2  2  2  2  2  4  1  1  2  2   1  3  3  2  2  3  2  3  2  3  3
5.097E-10  2  2  3  1  3  3  2  1  3  1  5  2  2  2  2  2  3  1  1  2  2   2  1  3  1  2  5  3  1  2  3  1
5.226E-10  4  2  2  1  3  2  3  2  3  1  3  2  2  1  1  3  2  1  2  2  2   1  2  3  4  1  4  2  3  1  4  3
5.309E-10  4  2  1  2  2  3  2  1  4  1  4  3  2  1  1  2  1  2  1  1  1   1  3  2  4  3  4  4  2  4  4  3
5.617E-10  2  3  3  1  4  2  2  3  3  1  6  2  2  2  1  2  4  2  1  1  1   2  3  3  3  4  3  2  1  2  4  3
5.725E-10  3  1  2  1  2  3  2  2  2  2  5  2  2  1  2  2  3  2  2  1  2   2  3  2  2  4  3  3  3  3  3  4
5.931E-10  3  2  3  2  2  2  3  2  1  1  5  3  2  2  1  2  2  2  2  2  1   1  2  2  4  4  4  3  2  1  4  3
6.365E-10  3  2  3  2  3  2  2  3  3  1  3  2  2  1  2  2  1  3  1  1  2   2  1  3  3  3  4  4  4  3  4  2
6.638E-10  2  3  1  1  3  2  3  3  3  1  7  3  2  2  1  3  2  1  2  2  2   1  2  2  2  2  4  3  2  3  3  2
6.948E-10  3  3  3  2  2  3  3  3  2  1  6  2  1  2  1  2  4  3  2  1  1   1  2  3  3  4  3  4  2  1  4  2
7.027E-10  2  3  3  2  2  3  2  2  4  2  9  2  2  1  1  3  2  2  1  1  2   2  2  1  1  2  3  4  2  2  3  3
7.090E-10  4  2  2  2  3  2  4  2  3  1  3  2  2  2  1  2  1  2  1  2  2   2  2  3  4  2  2  4  2  4  3  4
7.153E-10  2  3  2  1  2  2  3  2  4  1  7  2  2  1  2  3  3  1  1  2  1   2  1  2  3  1  1  3  2  2  2  3
7.258E-10  2  3  2  1  2  2  1  3  1  1  4  2  2  1  2  2  3  2  1  2  2   2  1  2  1  2  2  2  2  2  4  3
7.286E-10  1  2  2  2  4  4  1  2  2  1  2  2  2  1  2  2  1  1  2  2  2   1  1  2  5  5  4  1  3  2  3  2
7.335E-10  2  3  4  2  3  2  2  2  3  1  5  2  1  2  2  2  2  1  1  1  1   2  3  1  2  2  3  3  2  2  2  3
7.367E-10  3  2  3  1  4  1  3  3  2  1  6  2  2  1  1  2  4  2  1  1  2   2  3  3  5  4  2  3  2  3  3  3
7.396E-10  2  3  4  2  3  3  3  2  3  2  3  2  2  2  2  2  1  1  1  2  2   2  2  3  5  1  4  3  1  3  3  2
7.530E-10  2  3  4  2  2  3  1  2  3  1  6  3  2  2  2  2  2  1  1  2  1   2  2  4  2  2  3  2  4  2  4  2
7.951E-10  3  3  3  2  2  2  2  2  1  1  9  3  2  2  2  3  3  1  1  2  2   1  3  2  2  3  4  3  3  3  4  3
8.048E-10  2  3  3  1  3  2  2  3  4  2  8  2  2  1  2  3  2  1  2  1  1   2  2  2  2  4  4  2  2  2  4  2
8.078E-10  3  2  3  2  3  2  3  4  2  1  8  2  2  2  1  2  3  1  2  1  1   2  1  3  4  2  5  3  3  2  3  3
8.121E-10  3  3  2  2  2  2  3  3  3  2  6  2  1  2  2  3  2  1  1  1  1   2  2  3  1  3  3  2  2  3  3  3
8.364E-10  2  3  2  1  2  2  4  2  4  1  5  3  2  1  2  2  5  2  1  1  1   2  1  2  2  2  3  2  3  3  3  2
8.609E-10  3  3  4  2  2  1  2  3  3  1  4  2  2  2  2  3  5  2  1  2  2   2  2  3  2  2  4  3  2  2  4  4
8.649E-10  4  2  4  2  1  3  3  2  3  1  6  3  2  1  2  3  1  2  2  2  1   2  1  3  1  4  4  4  3  4  3  2
8.717E-10  2  3  2  1  2  3  3  3  2  1  8  1  2  1  2  2  4  3  1  1  1   2  1  3  3  2  4  3  4  3  4  3
8.731E-10  2  2  2  1  4  2  3  2  1  1  9  2  2  1  2  3  1  1  1  1  1   1  2  4  4  2  3  2  3  3  4  2
9.424E-10  2  3  2  1  2  3  2  1  3  1  5  2  1  1  1  3  5  2  1  2  1   2  1  2  2  5  2  3  3  2  2  3
9.435E-10  3  2  3  1  3  2  2  3  1  1  5  2  2  2  2  3  1  2  1  1  2   1  1  2  2  3  5  1  2  1  1  4
9.679E-10  3  3  2  2  2  2  2  3  2  1  3  3  2  2  2  2  3  1  1  1  1   1  2  4  3  2  2  3  2  4  2  3
1.013E-09  1  3  1  1  2  3  2  2  3  1  5  1  2  2  2  2  2  1  1  1  1   1  1  2  2  2  4  4  3  1  3  2
1.080E-09  2  3  2  1  3  2  3  3  1  2  5  2  1  2  2  2  2  2  1  2  2   2  2  1  4  3  3  3  3  2  4  2
1.137E-09  2  3  3  1  3  2  4  3  2  1  2  3  2  1  2  1  3  2  2  2  2   2  3  3  2  4  5  3  3  3  4  3
1.149E-09  2  3  3  2  3  3  2  3  2  1  1  2  2  1  1  3  2  2  2  2  2   2  3  2  4  4  4  2  2  3  1  3
1.174E-09  2  3  3  1  3  2  3  2  3  1  7  2  1  1  2  3  2  1  1  1  1   2  2  3  3  2  4  3  2  2  4  4
1.191E-09  4  2  3  1  4  2  3  4  3  2  6  2  1  1  2  2  3  2  1  1  2   2  2  1  2  2  4  2  4  2  1  3
1.241E-09  3  2  3  1  3  3  2  2  2  1  7  3  2  1  2  3  4  3  1  1  1   2  2  2  2  3  5  3  2  3  2  3
1.257E-09  3  3  4  1  3  2  1  4  3  2  7  2  1  1  1  1  2  1  1  2  2   1  3  4  3  4  3  3  1  3  4  3
1.272E-09  3  3  3  2  3  1  3  1  2  1  3  3  2  2  1  3  3  2  1  2  2   1  3  1  4  3  5  2  3  3  3  2
1.274E-09  2  3  2  1  3  2  3  2  3  1  7  2  2  2  1  2  1  3  1  2  1   2  3  3  2  4  4  2  3  4  2  2
1.303E-09  3  2  3  1  2  3  1  2  2  2  2  2  2  2  1  2  2  2  1  2  1   1  3  2  2  1  3  2  3  3  2  2
1.324E-09  3  3  3  1  3  3  2  2  2  1  6  2  2  2  1  1  5  1  1  2  1   2  2  1  2  4  4  3  3  3  2  4
1.328E-09  2  3  2  2  3  3  3  2  2  1  7  3  2  1  1  4  3  2  1  2  1   2  2  2  3  3  3  3  2  3  2  4
1.347E-09  4  2  1  1  2  4  1  1  4  1  8  3  2  2  2  1  3  2  1  1  1   2  2  2  4  2  4  3  1  3  2  3
1.369E-09  3  3  2  2  3  4  4  3  3  1  5  3  2  1  1  1  5  2  1  2  1   2  1  3  2  2  3  2  2  4  4  2
1.374E-09  3  3  2  1  3  2  2  2  2  1  7  3  2  1  1  3  1  3  1  2  1   2  3  1  3  4  4  4  2  3  3  1
1.415E-09  3  3  2  2  2  2  3  2  2  1  8  2  2  1  2  2  2  2  2  2  2   2  3  2  2  2  5  3  3  3  4  3
1.508E-09  4  3  3  2  3  3  2  4  3  2  3  3  2  1  2  3  2  2  1  1  1   1  3  2  4  4  2  3  2  3  3  3
1.583E-09  4  3  3  2  2  3  3  1  2  1  4  2  1  1  2  2  5  1  2  2  1   2  3  2  2  2  4  2  3  1  4  3
1.599E-09  2  4  3  1  4  2  2  2  3  2  7  3  2  2  1  2  1  2  2  1  2   2  3  2  1  3  2  2  4  1  2  3
1.821E-09  3  3  2  1  4  1  2  2  2  1  9  2  2  1  2  2  4  1  1  2  1   2  2  2  2  2  3  3  1  3  4  2
1.823E-09  3  3  2  1  3  3  1  1  4  1  5  3  2  1  2  2  3  1  2  2  2   2  2  3  1  2  4  3  3  1  2  3
1.871E-09  3  4  2  2  4  3  2  3  2  1  5  2  2  2  2  2  4  2  2  1  2   2  3  3  2  2  3  2  3  2  4  2
2.168E-09  2  3  4  1  4  4  3  3  3  1  3  3  2  2  2  3  1  1  1  1  2   2  1  2  4  4  3  2  3  2  4  3
2.173E-09  3  4  4  1  3  2  2  4  2  2  8  2  2  2  2  2  4  2  2  2  2   1  1  3  3  2  3  3  4  2  3  3
2.634E-09  3  2  2  1  1  1  3  2  2  1  5  2  2  2  1  3  4  2  1  2  1   2  2  2  3  3  5  2  2  2  4  4
3.012E-09  2  4  2  1  3  3  2  3  3  1  6  3  2  1  1  2  4  1  2  2  1   2  2  1  5  2  3  2  3  2  3  3
3.168E-09  2  4  3  2  2  3  2  3  2  1  3  3  2  1  2  2  5  1  2  2  2   2  2  2  2  2  3  3  2  3  3  2
3.888E-09  3  2  2  2  2  3  2  3  4  1  2  2  2  1  1  3  5  2  2  1  1   1  2  3  3  3  5  4  3  3  4  2
3.970E-09  4  3  3  1  2  3  2  3  2  1  3  2  2  1  1  2  4  1  1  1  2   2  3  4  2  1  4  2  3  2  2  2
5.872E-09  3  4  4  1  2  3  3  2  2  1  3  2  2  2  2  3  1  2  1  2  2   2  2  2  2  4  4  3  1  2  3  3
5.886E-09  1  4  3  2  1  3  2  3  3  1  9  2  2  1  1  2  2  1  1  2  2   2  2  1  4  3  4  2  2  3  4  3
6.074E-09  3  4  3  1  2  2  2  2  3  1  6  3  2  2  2  3  5  1  1  2  1   2  2  2  4  2  5  3  2  2  3  4
6.791E-09  2  4  3  1  3  4  2  3  2  1  6  2  2  2  1  3  3  1  2  2  2   2  3  3  2  2  2  3  2  4  3  3
7.932E-09  4  4  3  2  1  2  4  3  2  1  5  1  2  1  1  2  1  2  1  2  1   2  1  2  3  2  2  4  4  2  3  2
9.846E-09  2  4  2  1  2  3  4  4  3  1  5  3  2  1  1  3  1  2  1  1  1   1  1  2  3  4  4  2  4  3  3  3
1.090E-08  4  4  3  2  2  3  2  2  2  1  6  3  2  1  1  2  3  2  1  2  1   2  3  2  4  2  2  3  3  3  3  3
1.127E-08  3  4  3  1  4  3  3  1  3  2  6  2  2  1  1  2  4  1  2  2  1   1  2  2  2  3  4  3  2  4  4  4
1.137E-08  3  4  2  2  3  2  2  3  2  1  3  3  2  2  1  2  5  3  2  1  2   2  3  2  2  2  4  3  2  3  3  4
1.414E-08  2  4  3  1  3  4  1  2  3  1  6  2  2  2  1  3  2  3  1  2  1   2  1  2  2  2  5  3  3  2  3  4

    MEAN =     1.210E-09     VARIANCE =     5.366E-18

    PERCENTILES :
        5-TH =     5.731E-11  50-TH =     4.632E-10  95-TH =     6.074E-09
    LOGARITHMIC MIDPOINT (OF POINTS > 0.) =     5.083E-10
    NUMBER ABOVE MIDPOINT = 70
    NUMBER BELOW MIDPOINT = 80
    CHI-SQUARED(1) =     6.667E-01
    DO NOT REJECT NULL (p > .05)
```

```
CONSEQUENCE MEASURE:
 IND.RISK OF FATALITY


 BASE CASE :
  PEACH BOTTOM LLH (CRAC2)

 FRACTIONAL CONTRIBUTION OF EACH SEQUENCE TO MEAN RISK
                  SEQUENCE              CONTRIBUTION
                     TB                      0.1225
                    TBUX                    0.7020
                    TBU                      0.0057
                    TCSX                    0.0147
                    TCUX                    0.0021
                   TCSRX2                  0.1073
                  TCSRV23                 0.0457
CONSEQUENCE MEASURE:
 IND.RISK OF FATALITY


 BASE CASE :
  PEACH BOTTOM LLH (CRAC2)

 FRACTIONAL CONTRIBUTION OF EACH NONZERO BIN TO MEAN RISK
                      BIN                CONTRIBUTION
          AAACAAGEFABCCABBEDABBB              0.0001
          AAACAAGEFABCCABBEEABBB              0.0001
          AAACACDEEABCCACBEDABBB              0.0001
          AAACACGEFABCCABBEDABBB              0.0001
          AAACACGEFABCCABBEEABBB              0.0002
          AAACACGGDABCBABBECABBB              0.0002
          AAACACGGDABCBABBEDABBB              0.0003
          AAACACGGDABCBABBEEABBB              0.0002
          AAACACGGDABCBADBECABBB              0.0001
          AAACACGGDABCBADBEDABBB              0.0002
          AAACACGGDABCBADBEEABBB              0.0003
          BAACAAGBDAACBBBBHHABBB              0.0001
          BAACAAGBDAACBDDBHHABBB              0.0001
          BAACAAGBDABCBBBBHHABBB              0.0004
          BAACAAGBDABCBDDBHHABBB              0.0001
          BAACAAGBFAACCBBBHHABBB              0.0001
          BAACAAGBFABCCBBBHHABBB              0.0002
          BAACAAGBFABCCBBBHHBABB              0.0001
          BAACACGBDAACBBBBHHABBB              0.0042
          BAACACGBDAACBDDBHHABBB              0.0024
          BAACACGBDABCBBBBHHABBB              0.0005
          BAACACGBDABCBDDBHHABBB              0.0004
          BAACACGBFAACCBBBHHABBB              0.0015
          BAACACGBFAACCBBBHHBABB              0.0001
          BAACACGBFAACCDDBHHABBB              0.0002
          BAACACGBFABCCBBBHHABBB              0.0005
          BAACACGBFABCCDDBHHABBB              0.0001
          BAACACGGDAACBABBDDABBB              0.0003
          BAACACGGDAACBADBDDABBB              0.0001
          BAACACGGDABCBABBDEABBB              0.0001
          BAACCCGBFAACCBBBHHABBB              0.0002
          BAACCCGGDAACBADBDEABBB              0.0002
          BABBACGCFAACCBBBHHABBB              0.0002
          BABBACGCFAACCBBBHHBBBB              0.0001
          BABBACGGDAACBABBEGABBB              0.0001
          BABBACGGDABCBABBEGABBB              0.0001
          BABBACGGDABCBADBEGABBB              0.0001
          BABBCCGGDAACBADBEGABBB              0.0002
          BACBAAGCFABCCBBBHHABBB              0.0003
          BACBAAGCFABCCDDBHHABBB              0.0009
          CAACAABGDDACBABBADABAB              0.0001
          CAACAABGDDACBABBAEABAB              0.0001
          CAACAABGFDACBCCBABBAAB              0.0002
          CAACAABGFDACBCCBACABAB              0.0007
          CAACAABGFDACBCCBADABAB              0.0010
          CAACAABGFDACBCCBAEABAB              0.0005
          CAACACBGDABCBABBADABAB              0.0001
          CAACACBGDABCBABBAEABAB              0.0001
          CAACACBGDDACBABBADABAB              0.0003
          CAACACBGDDACBABBAEABAB              0.0004
          CAACACBGDDACBABBAGABAB              0.0001
          CAACACBGDDACBCCBAABAAB              0.0008
          CAACACBGDDACBCDBABBAAB              0.0003
          CAACACBGDDACBCDBACABAB              0.0001
          CAACACBGDDACBCDBADABAB              0.0019
          CAACACBGDDACBCDBAEABAB              0.0022
          CAACACBGDDACBCDBAFABAB              0.0002
          CAACACBGDDACBDDBAABAAB              0.0001
          CAACACBGDDACBDDBADABAB              0.0002
          CAACACBGDDACBDDBAEABAB              0.0002
          CAACACBGFDACBCCBACABAB              0.0044
```

BEST COPY AVAILABLE

CAACACBGFDACBCCBADABAB	0.0044
CAACACBGFDACBCCBAEABAB	0.0002
CAACACBGFDACBCDBACABAB	0.0037
CAACACBGFDACBCDBADABAB	0.0042
CAACACBGFDACBCDBAEABAB	0.0006
CAACCCBGDDACBABBADABAB	0.0001
CAACCCBGDDACBABBAEABAB	0.0001
CAACCCBGDDACBCDBADABAB	0.0001
CAACCCBGDDACBCDBAEABAB	0.0001
CAACCCBGFDACBCCBACABAB	0.0016
CAACCCBGFDACBCCBADABAB	0.0013
CAACCCBGFDACBCCBAEABAB	0.0004
CAACCCBGFDACBCDBACABAB	0.0003
CAACCCBGFDACBCDBADABAB	0.0002
CAACCCBGFDACBCDBAEABAB	0.0005
DAAAAAGBDABCBBBBHHABBB	0.0006
DAAAAAGBDABCBDDBHHABBB	0.0002
DAAAAAGBDDACBBBBHHABBB	0.0064
DAAAAAGBDDACBBBBHHBABB	0.0004
DAAAAAGBDDACBDDBHHABBB	0.0027
DAAAAAGBFABCCBBBHHABBB	0.0006
DAAAAAGBFDACCBBBHHABBB	0.0096
DAAAAAGBFDACCBBBHHBABB	0.0002
DAAAAAGBFDACCDDBHHABBB	0.0033
DAAAAAGBFDACCDDBHHBABB	0.0001
DAAAAAGGDDACBBBBACABAB	0.0001
DAAAAAGGDDACBBBBADABAB	0.0005
DAAAAAGGDDACBBBBAEABAB	0.0006
DAAAAAGGDDACBDDBADABAB	0.0001
DAAAAAGGDDACBDDBAEABAB	0.0003
DAAAACGBDABCBBBBHHABBB	0.0006
DAAAACGBDABCBDDBHHABBB	0.0004
DAAAACGBDDACBBBBHHABBB	0.0125
DAAAACGBDDACBBBBHHBABB	0.0009
DAAAACGBDDACBDDBHHABBB	0.0027
DAAAACGBFABCCBBBHHABBB	0.0004
DAAAACGBFABCCDDBHHABBB	0.0001
DAAAACGBFDACBBBBHHABAB	0.0002
DAAAACGBFDACCBBBHHABBB	0.0125
DAAAACGBFDACCBBBHHBABB	0.0002
DAAAACGBFDACCDDBHHABBB	0.0007
DAAAACGGDABCBDDBAEABAB	0.0002
DAAAACGGDDACBBBBABBAAB	0.0001
DAAAACGGDDACBBBBADABAB	0.0028
DAAAACGGDDACBBBBAEABAB	0.0091
DAAAACGGDDACBBDBHABABB	0.0001
DAAAACGGDDACBDDBADABAB	0.0001
DAAAACGGDDACBDDBAEABAB	0.0010
DAAAACGGDDACBDDBAGABAB	0.0001
DAAACCGBDDACBBBBHHABBB	0.0024
DAAACCGBDDACBDDBHHABBB	0.0001
DAAACCGBFDACCBBBHHABBB	0.0013
DAAACCGBFDACCDDBHHABBB	0.0005
DAAACCGGDDACBDDBADABAB	0.0001
DAAACCGGDDACBDDBAEABAB	0.0001
DABAAAGADABCBBBBHGABAB	0.0012
DABAAAGADABCBDDBHGABAB	0.0013
DABAAAGADDACBBBBHGABAB	0.0026
DABAAAGADDACBDDBHGABAB	0.0007
DABAACGADABCBBBBHGABAB	0.0031
DABAACGADABCBDDBHGABAB	0.0003
DABAACGADDACBBBBHGABAB	0.0292
DABAACGADDACBDDBHGABAB	0.0038
DACAAAGADABCCBBBHHABBB	0.0030
DACAAAGADABCCDDBHHABBB	0.0002
DACAAAGADDACCBBBHHABBB	0.0002
DACAAAGADDACCDDBHHABBB	0.0001
EBAACCFGFDBCBADBEHBBBB	0.0002
EBAACCGGDDBCBABBEGABBB	0.0004
EBAACCGGDDBCBABBEGBBBB	0.0002
EBAACCGGDDBCBABBEHABBB	0.0018
EBAACCGGDDBCBABBEHBBBB	0.0016
EBAACCGGDDBCBADBEHABBB	0.0008
EBAACCGGDDBCBADBEHBBBB	0.0006
EBACBBGEFCBCCABBFBBABA	0.0001
EBACBBGEFCBCCABBFCABBA	0.0001
EBACBBGEFCBCCABBFCBABA	0.0003
EBACBBGEFCBCCABBFEABBA	0.0006
EBACBBGEFCBCCABBFFABBA	0.0001
EBACBBGGDCBCBABBFBBABA	0.0096
EBACBBGGDCBCBABBFCBABA	0.0015
EBACBBGGDCBCBABBFDABBA	0.0007
EBACBBGGDCBCBABBFEABBA	0.0013
EBACBBGGDCBCBABBFFABBA	0.0011
EBACBBGGDCBCBABBFGABBA	0.0001
EBACBCGEFCBCCABBFCBABA	0.0003

EBACBCGEFCBCCABBFEABBA	0.0001
EBACBCGEFCBCCABBFFABBA	0.0001
EBACBCGGDCBCBABBFBBABA	0.0067
EBACBCGGDCBCBABBFCBABA	0.0015
EBACBCGGDCBCBABBFDABBA	0.0008
EBACBCGGDCBCBABBFEABBA	0.0018
EBACBCGGDCBCBABBFFABBA	0.0010
EBACBCGGDCBCBABBFFBBBA	0.0010
EBACBCGGDCBCBABBFGABBA	0.0001
EBACBCGGDCBCBADBFBBABA	0.0039
EBACBCGGDCBCBADBFEABBA	0.0005
EBACBCGGDCBCBADBFFABBA	0.0004
EBACCCDEEDBCCADBFBBABB	0.0002
EBACCCDGFDBCBABBFBBABB	0.0003
EBACCCDGFDBCBACBFBBABB	0.0001
EBACCCDGFDBCBADBFBBABB	0.0044
EBACCCFGFDBBBABBFBBABB	0.0004
EBACCCFGFDBBBACBFEABBB	0.0002
EBACCCFGFDBBBADBFCBABB	0.0012
EBACCCFGFDBBBADBFEABBB	0.0025
EBACCCFGFDBBBADBFFABBB	0.0001
EBACCCFGFDBCBABBFBBABB	0.0009
EBACCCFGFDBCBABBFCABBB	0.0001
EBACCCFGFDBCBABBFCBABB	0.0060
EBACCCFGFDBCBABBFEABBB	0.0162
EBACCCFGFDBCBADBFEBBBB	0.0004
EBACCCFGFDBCBABBFFABBB	0.0002
EBACCCFGFDBCBABBFGABBB	0.0001
EBACCCFGFDBCBACBFBBABB	0.0001
EBACCCFGFDBCBACBFCBABB	0.0019
EBACCCFGFDBCBACBFEABBB	0.0010
EBACCCFGFDBCBADBFBBABB	0.0010
EBACCCFGFDBCBADBFCABBB	0.0003
EBACCCFGFDBCBADBFCBABB	0.0246
EBACCCFGFDBCBADBFDBBBB	0.0001
EBACCCFGFDBCBADBFEABBB	0.0109
EBACCCFGFDBCBADBFEBBBB	0.0020
EBACCCFGFDBCBADBFFABBB	0.0006
EBACCCFGFDBCBADBFGABBB	0.0002
EBACCCGDFDBCBABBFABAAB	0.0001
EBACCCGDFDBCBABBFBBABB	0.0002
EBACCCGDFDBCCABBFBBABB	0.0001
EBACCCGEFDBBCABBFBBABB	0.0002
EBACCCGEFDBCCABBFBBABB	0.0004
EBACCCGEFDBCCABBFCABBB	0.0001
EBACCCGEFDBCCABBFCBABB	0.0005
EBACCCGEFDBCCABBFEABBB	0.0007
EBACCCGEFDBCCADBFCBABB	0.0096
EBACCCGEFDBCCADBFEBBBB	0.0013
EBACCCGFFDBCBABBFEABBB	0.0002
EBACCCGFFDBCCABBFEABBB	0.0002
EBACCCGGDDBBBABBFABABB	0.0013
EBACCCGGDDBBBABBFBBABB	0.0002
EBACCCGGDDBBBABBFEABBB	0.0017
EBACCCGGDDBBBABBFFABBB	0.0012
EBACCCGGDDBBBABBFGABBB	0.0002
EBACCCGGDDBBBADBFABABB	0.0011
EBACCCGGDDBBBADBFCBABB	0.0012
EBACCCGGDDBBBADBFEABBB	0.0003
EBACCCGGDDBBBADBFFBBBB	0.0002
EBACCCGGDDBCBABBFABABB	0.0699
EBACCCGGDDBCBABBFBABAB	0.0002
EBACCCGGDDBCBABBFBBABB	0.1907
EBACCCGGDDBCBABBFCBABB	0.0307
EBACCCGGDDBCBABBFCBBBB	0.0030
EBACCCGGDDBCBABBFDABBB	0.0099
EBACCCGGDDBCBABBFDBBBB	0.0009
EBACCCGGDDBCBABBFEABBB	0.0483
EBACCCGGDDBCBABBFEBBBB	0.0153
EBACCCGGDDBCBABBFFABBB	0.0432
EBACCCGGDDBCBABBFFBBBB	0.0065
EBACCCGGDDBCBABBFGABBB	0.0094
EBACCCGGDDBCBADBFABABB	0.0243
EBACCCGGDDBCBADBFBBABB	0.0369
EBACCCGGDDBCBADBFCBABB	0.0037
EBACCCGGDDBCBADBFEABBB	0.0114
EBACCCGGDDBCBADBFEBBBB	0.0004
EBACCCGGDDBCBADBFFABBB	0.0033
EBACCCGGDDBCBADBFFBBBB	0.0047
EBACCCGGDDBCBADBFGABBB	0.0001
EBACCCGGEDBBBABBFBBABB	0.0011
EBACCCGGEDBBBABBFEABBB	0.0001
EBACCCGGEDBBBABBFFBBBB	0.0001
EBACCCGGEDBBBADBFEABBB	0.0017
EBACCCGGEDBCBABBFBBABB	0.0023
EBACCCGGEDBCBABBFCABBB	0.0001

EBACCCGGEDBCBABBFCBABB	0.0137
EBACCCGGEDBCBABBFCBBBB	0.0022
EBACCCGGEDBCBABBFEABBB	0.0134
EBACCCGGEDBCBABBFEBBBB	0.0012
EBACCCGGEDBCBABBFFABBB	0.0004
EBACCCGGEDBCBABBFFBBBB	0.0003
EBACCCGGEDBCBABBFGABBB	0.0002
EBACCCGGEDBCBABBFGBBBB	0.0001
EBACCCGGEDBCBADBFCBABB	0.0116
EBACCCGGEDBCBADBFDBBBB	0.0001
EBACCCGGEDBCBADBFEABBB	0.0028
EBACCCGGEDBCBADBFEBBBB	0.0009
EBACCCGGEDBCBADBFFABBB	0.0001
EBBBACGEFBBCCABBDGABBB	0.0005
EBBBACGEFBBCCABBEGABBB	0.0006
EBBBACGGDBBBBABBDGABBB	0.0002
EBBBACGGDBBBBABBEGABBB	0.0002
EBBBACGGDBBCBABBDGABBB	0.0011
EBBBACGGDBBCBABBEGABBB	0.0014
EBBBACGGDBBCBADBDGABBB	0.0009
EBBBACGGDBBCBADBEGABBB	0.0009
EBCBAAGCFBBACDDBHHABBB	0.0001
FCACBBGGDCBCBABBDBBABA	0.0001
FCACBBGGDCBCBABBDCBABA	0.0001
FCACBBGGDCBCBABBDDABBA	0.0001
FCACBBGGDCBCBABBDEABBA	0.0001
FCACBBGGDCBCBABBEBBABA	0.0002
FCACBBGGDCBCBABBECBABA	0.0001
FCACBBGGDCBCBABBEEABBA	0.0002
FCACBCGGDCBCBABBDBBABA	0.0001
FCACBCGGDCBCBABBDCBABA	0.0001
FCACBCGGDCBCBABBDDABBA	0.0001
FCACBCGGDCBCBABBDEABBA	0.0002
FCACBCGGDCBCBABBEBBABA	0.0001
FCACBCGGDCBCBABBEEABBA	0.0002
FCACBCGGDCBCBADBDCBABA	0.0001
FCACBCGGDCBCBADBDFABBA	0.0001
FCACBCGGDCBCBADBECBABA	0.0002
FCACBCGGDCBCBADBEEABBA	0.0001
FCACCCDEEDBCCADBEBBABB	0.0001
FCACCCDGFDBCBACBDCBABB	0.0001
FCACCCDGFDBCBACBEBBABB	0.0002
FCACCCDGFDBCBADBDBBABB	0.0009
FCACCCDGFDBCBADBDCBABB	0.0005
FCACCCDGFDBCBADBDEABBB	0.0003
FCACCCDGFDBCBADBEBBABB	0.0026
FCACCCDGFDBCBADBECBABB	0.0003
FCACCCFGFDBCBABBDEABBB	0.0003
FCACCCFGFDBCBABBDFABBB	0.0001
FCACCCFGFDBCBABBECBABB	0.0001
FCACCCFGFDBCBABBEEABBB	0.0006
FCACCCFGFDBCBABBGEABBB	0.0009
FCACCCFGFDBCBADBCFABBB	0.0001
FCACCCFGFDBCBADBDEABBB	0.0001
FCACCCFGFDBCBADBDEBBBB	0.0001
FCACCCFGFDBCBADBDFABBB	0.0002
FCACCCFGFDBCBADBDFBBBB	0.0001
FCACCCFGFDBCBADBEBBABB	0.0002
FCACCCFGFDBCBADBECBABB	0.0002
FCACCCFGFDBCBADBEEABBB	0.0013
FCACCCFGFDBCBADBEEBBBB	0.0001
FCACCCFGFDBCBADBEFABBB	0.0002
FCACCCFGFDBCBADBEGABBB	0.0003
FCACCCFGFDBCBADBGBBABB	0.0001
FCACCCGBDDBCBABBHHABBB	0.0003
FCACCCGBDDBCBABBHHBABB	0.0001
FCACCCGBDDBCBDDBHHABBB	0.0006
FCACCCGBDDBCBDDBHHBABB	0.0004
FCACCCGBFDBBCDDBHHABBB	0.0001
FCACCCGBFDBCCDDBHHABBB	0.0002
FCACCCGBFDBCCDDBHHBABB	0.0001
FCACCCGDFDBCBABBEBBABB	0.0001
FCACCCGDFDBCBADBDCBABB	0.0003
FCACCCGDFDBCCABBEBBABB	0.0001
FCACCCGDFDBCCADBDCBABB	0.0001
FCACCCGEFDBCCABBEEABBB	0.0002
FCACCCGEFDBCCADBEGABBB	0.0005
FCACCCGFFDBCCABBGEABBB	0.0001
FCACCCGGDDBBBABBECBABB	0.0001
FCACCCGGDDBBBABBEEABBB	0.0024
FCACCCGGDDBBBADBGCBABB	0.0005
FCACCCGGDDBCBABBCABABB	0.0001
FCACCCGGDDBCBABBCBBABB	0.0018
FCACCCGGDDBCBABBDABABB	0.0012
FCACCCGGDDBCBABBDBBABB	0.0065
FCACCCGGDDBCBABBDCABBB	0.0001

286

FCACCCGGDDBCBABBDCBABB	0.0035
FCACCCGGDDBCBABBDDABBB	0.0026
FCACCCGGDDBCBABBDEABBB	0.0030
FCACCCGGDDBCBABBDEBBBB	0.0002
FCACCCGGDDBCBABBDFABBB	0.0024
FCACCCGGDDBCBABBDFBBBB	0.0001
FCACCCGGDDBCBABBDGABBB	0.0050
FCACCCGGDDBCBABBEABABB	0.0026
FCACCCGGDDBCBABBEBBABB	0.0089
FCACCCGGDDBCBABBECBABB	0.0022
FCACCCGGDDBCBABBEDABBB	0.0007
FCACCCGGDDBCBABBEEABBB	0.0127
FCACCCGGDDBCBABBEEBBBB	0.0005
FCACCCGGDDBCBABBEFABBB	0.0017
FCACCCGGDDBCBABBEFBBBB	0.0003
FCACCCGGDDBCBABBEGABBB	0.0012
FCACCCGGDDBCBABBGABABB	0.0002
FCACCCGGDDBCBABBGBBABB	0.0015
FCACCCGGDDBCBABBGCBABB	0.0013
FCACCCGGDDBCBABBGEABBB	0.0003
FCACCCGGDDBCBACBEABABB	0.0001
FCACCCGGDDBCBADBDABABB	0.0009
FCACCCGGDDBCBADBDBBABB	0.0012
FCACCCGGDDBCBADBDCBABB	0.0017
FCACCCGGDDBCBADBDEABBB	0.0016
FCACCCGGDDBCBADBDEBBBB	0.0001
FCACCCGGDDBCBADBDFABBB	0.0014
FCACCCGGDDBCBADBDGABBB	0.0036
FCACCCGGDDBCBADBEABABB	0.0016
FCACCCGGDDBCBADBEBBABB	0.0008
FCACCCGGDDBCBADBECBABB	0.0049
FCACCCGGDDBCBADBEEABBB	0.0017
FCACCCGGDDBCBADBEEBBBB	0.0002
FCACCCGGDDBCBADBEFABBB	0.0004
FCACCCGGDDBCBADBGCBABB	0.0008
FCACCCGGDDBCBADBGEABBB	0.0008
FCACCCGGEDBBBABBDEABBB	0.0001
FCACCCGGEDBCBABBDEABBB	0.0004
FCACCCGGEDBCBABBDFABBB	0.0001
FCACCCGGEDBCBABBEBBABB	0.0006
FCACCCGGEDBCBABBECBABB	0.0001
FCACCCGGEDBCBABBEEABBB	0.0023
FCACCCGGEDBCBABBGEABBB	0.0011
FCACCCGGEDBCBABBGFABBB	0.0002
FCACCCGGEDBCBADBCFABBB	0.0002
FCACCCGGEDBCBADBDCBABB	0.0002
FCACCCGGEDBCBADBEGABBB	0.0001
FCBBAAGCDBBBBBBBHHABBB	0.0003
FCBBAAGCDBBBBDDBHHABBB	0.0001
FCBBAAGCDBBCBBBBHHABBB	0.0007
FCBBAAGCDBBCBDDBHHABBB	0.0002
FCBBAAGCFBBBCBBBHHABBB	0.0002
FCBBAAGCFBBBCDDBHHABBB	0.0001
FCBBAAGCFBBCCBBBHHABBB	0.0006
FCBBAAGCFBBCCDDBHHABBB	0.0003
FCBBACGCDBBABBBBHHABBB	0.0001
FCBBACGCDBBBBBBBHHABBB	0.0004
FCBBACGCDBBBBDDBHHABBB	0.0002
FCBBACGCDBBCBBBBHHABBB	0.0011
FCBBACGCDBBCBBBBHHBBBB	0.0002
FCBBACGCDBBCBDDBHHABBB	0.0004
FCBBACGCFBBBCBBBHHABBB	0.0002
FCBBACGCFBBBCDDBHHABBB	0.0001
FCBBACGCFBBCCBBBHHABBB	0.0006
FCBBACGCFBBCCBBBHHBBBB	0.0002
FCBBACGCFBBCCDDBHHABBB	0.0004
FCBBACGCFBBCCDDBHHBBBB	0.0001
FCBBACGEFBBCCABBEGABBB	0.0004
FCBBACGEFBBCCABBEGBBBB	0.0001
FCBBACGEFBBCCADBEGABBB	0.0001
FCBBACGGDBBBBABBEGABBB	0.0002
FCBBACGGDBBBBADBEGABBB	0.0001
FCBBACGGDBBCBABBEGABBB	0.0006
FCBBACGGDBBCBABBEGBBBB	0.0001
FCBBACGGDBBCBADBEGABBB	0.0004
FCBBACGGDBBCBADBEGBBBB	0.0001
FCCBAAGCFBBACBBBHHABBB	0.0001
FCCBAAGCFBBACDDBHHABBB	0.0001
FCCBAAGCFBBBCBBBHHABBB	0.0014
FCCBAAGCFBBBCDDBHHABBB	0.0004
FCCBAAGCFBBCCBBBHHABBB	0.0041
FCCBAAGCFBBCCDDBHHABBB	0.0015

297

```
CONSEQUENCE MEASURE:
   IND.RISK OF FATALITY

   BASE CASE :
    PEACH BOTTOM LLH (CRAC2)

   FRACTIONAL CONTRIBUTIONS OF EACH RELEASE TO MEAN RISK
                    RELEASE                CONTRIBUTION
                    PCH  1D                  0.0000
                    PCH  2D                  0.0000
                    PCH  3D                  0.0169
                    PCH  4D                  0.0356
                    PCH  5D                  0.0657
                    PCH  6D                  0.1461
                    PCH  7D                  0.2072
                    PCH  8D                  0.2641
                    PCH  9D                  0.0952
                    PCH 10D                  0.0000
                    PCH 11D                  0.0000
                    PCH 12D                  0.0001
                    PCH 13D                  0.0000
                    PCH 14D                  0.0001
                    PCH 15D                  0.0011
                    PCH 16D                  0.0036
                    PCH 17D                  0.0000
                    PCH 18D                  0.0000
                    PCH 19D                  0.0002
                    PCH 20D                  0.0000
                    PCH 21D                  0.0006
                    PCH 22D                  0.0000
                    PCH 23D                  0.0006
                    PCH 24D                  0.0046
                    PCH 25D                  0.0000
                    PCH 26D                  0.0006
                    PCH 27D                  0.0040
                    PCH 28D                  0.0059
                    PCH 29D                  0.0047
                    PCH 30D                  0.0012
                    PCH 31D                  0.0027
                    PCH 32D                  0.0015
                    PCH 33D                  0.0018
                    PCH 34D                  0.0018
                    PCH 35D                  0.0000
                    PCH 36D                  0.0018
                    PCH 37D                  0.0015
                    PCH 38D                  0.0003
                    PCH 39D                  0.0088
                    PCH 40D                  0.0000
                    PCH 41D                  0.0020
                    PCH 42D                  0.0023
                    PCH 43D                  0.0052
                    PCH 44D                  0.0002
                    PCH 45D                  0.0052
                    PCH 46D                  0.0004
                    PCH 47D                  0.0011
                    PCH 48D                  0.0554
                    PCH 49D                  0.0000
                    PCH 50D                  0.0006
                    PCH 51D                  0.0093
                    PCH 52D                  0.0000
                    PCH 53D                  0.0000
                    PCH 54D                  0.0000
```

```
CONSEQUENCE MEASURE:
  IND.RISK OF FATALITY

  SENSITIVITY OF RISK TO ISSUES
  DISTRIBUTION OF RISK AT EACH LEVEL OF EACH ISSUE
  BASE CASE :
   PEACH BOTTOM LLH (CRAC2)

 GP ISS LVL NUM       5%          50%          MEAN         95%        R**2    F   DF         SIGNIF.
  1   1   1  15  0.1163E-09  0.1862E-09  0.6876E-09  0.3791E-08   0.07    3.4(  3,146)   0.02 *
          2  60  0.3430E-10  0.3766E-09  0.1076E-08  0.4639E-08
          3  60  0.6475E-10  0.4737E-09  0.1236E-08  0.5972E-08
          4  15  0.1717E-09  0.8649E-09  0.2164E-08  0.1007E-07
  1   2   1  15  0.3977E-10  0.2282E-09  0.2432E-09  0.5474E-09   0.36   27.5(  3,146)   0.00**
          2  60  0.2249E-10  0.2536E-09  0.4745E-09  0.1325E-08
          3  60  0.9773E-10  0.7296E-09  0.7912E-09  0.1822E-08
          4  15  0.1663E-08  0.6074E-08  0.6793E-08  0.1339E-07
  1   3   1  15  0.1251E-09  0.2092E-09  0.4025E-09  0.1255E-08   0.03    1.7(  3,146)   0.17NS
          2  60  0.2621E-10  0.3226E-09  0.9979E-09  0.3422E-08
          4  15  0.1858E-09  0.7396E-09  0.1152E-08  0.4580E-08
          3  60  0.8520E-10  0.5351E-09  0.1638E-08  0.9298E-08
  1   4   2  62  0.4247E-10  0.4600E-09  0.1169E-08  0.6632E-08   0.00    0.4(  1,148)   0.51NS
          1  88  0.7230E-10  0.4632E-09  0.1239E-08  0.6142E-08
  1   5   2  60  0.7181E-10  0.2975E-09  0.1129E-08  0.5972E-08   0.07    3.4(  3,146)   0.02 *
          3  60  0.7578E-10  0.4928E-09  0.1183E-08  0.4523E-08
          1  15  0.2478E-10  0.1285E-09  0.1238E-08  0.7362E-08
          4  15  0.1308E-09  0.7367E-09  0.1613E-08  0.7464E-08
  2   1   1  15  0.7467E-10  0.3434E-09  0.6567E-09  0.2402E-08   0.01    0.3(  3,146)   0.84NS
          2  60  0.3569E-10  0.4915E-09  0.9603E-09  0.3633E-08
          3  60  0.7817E-10  0.4895E-09  0.1430E-08  0.7613E-08
          4  15  0.3977E-10  0.2805E-09  0.1882E-08  0.1177E-07
  2   2   3  60  0.3664E-10  0.2960E-09  0.8038E-09  0.2390E-08   0.03    1.4(  3,146)   0.25NS
          2  60  0.6894E-10  0.5461E-09  0.1433E-08  0.6423E-08
          1  15  0.4316E-10  0.7258E-09  0.1564E-08  0.8470E-08
          4  15  0.2973E-10  0.4689E-09  0.1586E-08  0.9328E-08
  2   3   3  60  0.2621E-10  0.4029E-09  0.1178E-08  0.6323E-08   0.01    0.3(  3,146)   0.79NS
          2  60  0.8520E-10  0.5149E-09  0.1180E-08  0.5972E-08
          4  15  0.1100E-09  0.4689E-09  0.1281E-08  0.6749E-08
          1  15  0.7311E-10  0.5097E-09  0.1387E-08  0.7147E-08
  2   4   1  15  0.2432E-10  0.3786E-09  0.4792E-09  0.1044E-08   0.01    0.3(  3,146)   0.80NS
          4  15  0.3422E-10  0.5309E-09  0.8036E-09  0.3217E-08
          3  60  0.3993E-10  0.4666E-09  0.1305E-08  0.7733E-08
          2  60  0.8875E-10  0.4810E-09  0.1399E-08  0.7339E-08
  2   5   2  24  0.1387E-09  0.6343E-09  0.1126E-08  0.3561E-08   0.00    0.3(  1,148)   0.58NS
          1 126  0.5115E-10  0.4550E-09  0.1226E-08  0.6211E-08
  2   6   4   9  0.7316E-10  0.4622E-09  0.5490E-09  0.1583E-08   0.03    0.5(  8,141)   0.83NS
          8  16  0.1837E-10  0.3724E-09  0.6070E-09  0.1911E-08
          7  20  0.9987E-10  0.4342E-09  0.6634E-09  0.1482E-08
          1   2************************  0.6681E-09************
          2  11  0.1303E-09  0.4170E-09  0.8008E-09  0.3681E-08
          9  12  0.5803E-10  0.2877E-09  0.9364E-09  0.5235E-08
          5  22  0.6053E-10  0.7832E-09  0.1539E-08  0.8648E-08
          6  38  0.4530E-10  0.2960E-09  0.1688E-08  0.1112E-07
          3  20  0.6123E-10  0.6717E-09  0.1710E-08  0.8170E-08
  2   7   2  94  0.8266E-10  0.4322E-09  0.1064E-08  0.5430E-08   0.01    0.5(  2,147)   0.63NS
          3  51  0.2369E-10  0.4786E-09  0.1395E-08  0.9611E-08
          1   5  0.1722E-09  0.8717E-09  0.2060E-08  0.7932E-08
  2   8   1  15  0.2057E-10  0.7335E-09  0.6886E-09  0.1494E-08   0.00    0.0(  1,148)   0.84NS
          2 135  0.6692E-10  0.4480E-09  0.1268E-08  0.6604E-08
  2   9   2  75  0.3171E-10  0.3786E-09  0.1110E-08  0.6023E-08   0.01    1.3(  1,148)   0.26NS
          1  75  0.7457E-10  0.5226E-09  0.1310E-08  0.7362E-08
  2  10   2  75  0.3686E-10  0.5074E-09  0.7875E-09  0.2172E-08   0.00    0.2(  1,148)   0.63NS
          1  75  0.5913E-10  0.4038E-09  0.1622E-08  0.1063E-07
  2  11   4   4************************  0.4723E-09************   0.04    2.0(  3,146)   0.12NS
          1  16  0.2213E-10  0.1512E-09  0.4826E-09  0.1363E-08
          2  80  0.7601E-10  0.4821E-09  0.1227E-08  0.6833E-08
          3  50  0.1005E-09  0.5890E-09  0.1475E-08  0.6791E-08
  2  12   2  45  0.2296E-10  0.3030E-09  0.8982E-09  0.2120E-08   0.06    2.2(  4,145)   0.07NS
          3  38  0.1100E-09  0.3910E-09  0.9562E-09  0.4013E-08
          1  30  0.1002E-09  0.4877E-09  0.1306E-08  0.7932E-08
          4  22  0.3912E-10  0.6247E-09  0.1501E-08  0.6027E-08
          5  15  0.5667E-10  0.9422E-09  0.2170E-08  0.9720E-08
  2  13   2  75  0.5913E-10  0.3130E-09  0.1044E-08  0.5297E-08   0.01    0.7(  2,147)   0.50NS
          1  60  0.7344E-10  0.5040E-09  0.1168E-08  0.5980E-08
          3  15  0.3413E-10  0.6364E-09  0.2209E-08  0.1339E-07
  2  14   2  75  0.2478E-10  0.2439E-09  0.9114E-09  0.3694E-08   0.10   16.5(  1,148)   0.00**
          1  75  0.1181E-09  0.7367E-09  0.1509E-08  0.7420E-08
  2  15   1  60  0.6475E-10  0.4845E-09  0.1028E-08  0.3029E-08   0.00    0.1(  1,148)   0.71NS
          2  90  0.5436E-10  0.3889E-09  0.1331E-08  0.6791E-08
  2  16   2  75  0.5913E-10  0.4021E-09  0.9903E-09  0.5325E-08   0.01    1.0(  1,148)   0.31NS
          1  75  0.6334E-10  0.5309E-09  0.1430E-08  0.9328E-08
  2  17   2 120  0.4670E-10  0.3766E-09  0.1150E-08  0.5980E-08   0.02    2.3(  1,148)   0.13NS
          1  30  0.1002E-09  0.6791E-09  0.1448E-08  0.9846E-08
  3   1   4   3************************  0.3457E-09************   0.04    1.8(  3,146)   0.15NS
          2  74  0.4263E-10  0.3226E-09  0.9778E-09  0.5407E-08
          1  34  0.3353E-10  0.5696E-09  0.1476E-08  0.9429E-08
```

```
         3  39  0.9980E-10  0.5725E-09  0.1485E-08  0.8810E-08
 3   2   4  15  0.8381E-10  0.2489E-09  0.6510E-09  0.2978E-08   0.06    2.9(  3,146)   0.04 *
         1  29  0.5191E-10  0.2287E-09  0.7032E-09  0.3115E-08
         3  51  0.1008E-09  0.4480E-09  0.7424E-09  0.2157E-08
         2  55  0.2478E-10  0.7286E-09  0.2063E-08  0.1118E-07
 3   3   1  14  0.2701E-10  0.4370E-09  0.5886E-09  0.1775E-08   0.01    0.5(  4,145)   0.77NS
         5   7  0.4011E-10  0.7286E-09  0.7901E-09  0.3012E-08
         4  35  0.2844E-10  0.3125E-09  0.1113E-08  0.6027E-08
         3  36  0.1156E-09  0.4390E-09  0.1150E-08  0.6404E-08
         2  58  0.5552E-10  0.5390E-09  0.1507E-08  0.9203E-08
 3   4   5   5  0.6495E-10  0.3062E-09  0.4325E-09  0.9424E-09   0.03    1.1(  4,145)   0.38NS
         1  15  0.1258E-09  0.3746E-09  0.6592E-09  0.3005E-08
         3  30  0.5731E-10  0.4737E-09  0.1255E-08  0.5886E-08
         2  76  0.3297E-10  0.3278E-09  0.1299E-08  0.7571E-08
         4  24  0.4962E-10  0.7700E-09  0.1378E-08  0.6857E-08
 3   5   1   4*************************  0.2898E-09************   0.08    3.0(  4,145)   0.02 *
         3  46  0.8344E-10  0.3529E-09  0.7075E-09  0.2320E-08
         2  25  0.5855E-10  0.2805E-09  0.1094E-08  0.7630E-08
         4  50  0.2933E-10  0.6144E-09  0.1491E-08  0.9846E-08
         5  15  0.1902E-09  0.1137E-08  0.2331E-08  0.1144E-07
 3   6   1   4*************************  0.5197E-09************   0.00    0.0(  3,146)   1.00NS
         4  23  0.1019E-09  0.4622E-09  0.9542E-09  0.4990E-08
         2  47  0.4840E-10  0.5074E-09  0.1069E-08  0.4212E-08
         3  76  0.4394E-10  0.4400E-09  0.1411E-08  0.9457E-08
 3   7   1  18  0.2529E-10  0.2612E-09  0.7642E-09  0.3676E-08   0.02    1.0(  3,146)   0.40NS
         2  62  0.4384E-10  0.4390E-09  0.1197E-08  0.6351E-08
         3  55  0.1091E-09  0.5007E-09  0.1219E-08  0.3950E-08
         4  15  0.1187E-09  0.6364E-09  0.1765E-08  0.9328E-08
 3   8   1  25  0.2617E-10  0.2365E-09  0.4641E-09  0.1652E-08   0.06    3.1(  3,146)   0.03 *
         2  58  0.2905E-10  0.4029E-09  0.1184E-08  0.5992E-08
         3  52  0.1322E-09  0.6993E-09  0.1450E-08  0.9352E-08
         4  15  0.1376E-09  0.5309E-09  0.1722E-08  0.9930E-08
 3   9   1  12  0.2039E-10  0.2143E-09  0.4223E-09  0.1187E-08   0.02    1.1(  3,146)   0.35NS
         2  27  0.5011E-10  0.5007E-09  0.7968E-09  0.2048E-08
         4  54  0.3122E-10  0.4950E-09  0.9876E-09  0.3597E-08
         3  57  0.1101E-09  0.3786E-09  0.1782E-08  0.1052E-07
 3  10   1   7  0.2160E-10  0.3125E-09  0.4261E-09  0.1374E-08   0.02    1.0(  3,146)   0.42NS
         2  49  0.3905E-10  0.4170E-09  0.8786E-09  0.3892E-08
         3  73  0.6612E-10  0.4643E-09  0.1114E-08  0.5884E-08
         4  21  0.1122E-09  0.7090E-09  0.2578E-08  0.1254E-07
 3  11   1  75  0.6092E-10  0.4038E-09  0.9948E-09  0.3026E-08   0.00    0.3(  1,148)   0.58NS
         2  75  0.4525E-10  0.5007E-09  0.1425E-08  0.7630E-08
 3  12   2  50  0.2160E-10  0.3005E-09  0.6771E-09  0.3168E-08   0.04    2.9(  2,147)   0.06NS
         3  50  0.5731E-10  0.4467E-09  0.1214E-08  0.5886E-08
         1  50  0.1150E-09  0.7050E-09  0.1739E-08  0.1090E-07
 3  13   4  37  0.6710E-10  0.4021E-09  0.7622E-09  0.2687E-08   0.01    0.4(  3,146)   0.72NS
         1  38  0.4864E-10  0.3226E-09  0.9047E-09  0.4979E-08
         2  37  0.1959E-10  0.5617E-09  0.1493E-08  0.8315E-08
         3  38  0.8904E-10  0.4714E-09  0.1676E-08  0.1112E-07
 3  14   3  30  0.2933E-10  0.4845E-09  0.7782E-09  0.2173E-08   0.01    0.3(  4,145)   0.88NS
         4  30  0.7939E-10  0.4854E-09  0.1007E-08  0.3970E-08
         1  30  0.5731E-10  0.4095E-09  0.1333E-08  0.5846E-08
         5  30  0.4011E-10  0.3365E-09  0.1455E-08  0.7932E-08
         2  30  0.7316E-10  0.5519E-09  0.1476E-08  0.1090E-07
 4   1   6  19  0.3013E-10  0.2251E-09  0.4360E-09  0.1763E-08   0.08    1.7(  7,142)   0.11NS
         3  19  0.9450E-10  0.5617E-09  0.6556E-09  0.1735E-08
         1  19  0.3234E-10  0.2119E-09  0.9887E-09  0.4299E-08
         4  19  0.5385E-10  0.8364E-09  0.1078E-08  0.3507E-08
         2  18  0.3324E-10  0.6135E-09  0.1438E-08  0.7401E-08
         8  19  0.7336E-10  0.2890E-09  0.1592E-08  0.1041E-07
         5  19  0.1323E-09  0.7286E-09  0.1601E-08  0.6368E-08
         7  18  0.4508E-10  0.4103E-09  0.1941E-08  0.1122E-07
NS=NOT SIGNIFICANT, *=SIGNIFICANT (P<.05), **=SIGNIFICANT (P<.01)
```

```
    CONSEQUENCE MEASURE:  IND.RISK OF FATALITY
0   ISSUE GROUP =   1   ISSUE =   1   SLC FAILURE TO ACTUATE

    LEVEL 1 NO.<MED.= 12 NO. EXP.=  7     NO.>=MED.=  3 NO. EXP.=  8   CHI-SQ.(   6.7 DF= 1 SIG.= 0.010
    LEVEL 2 NO.<MED.= 32 NO. EXP.= 30     NO.>=MED.= 28 NO. EXP.= 30   CHI-SQ.(   0.3 DF= 1 SIG.= 0.606
    LEVEL 3 NO.<MED.= 28 NO. EXP.= 30     NO.>=MED.= 32 NO. EXP.= 30   CHI-SQ.(   0.3 DF= 1 SIG.= 0.606
    LEVEL 4 NO.<MED.=  2 NO. EXP.=  7     NO.>=MED.= 13 NO. EXP.=  8   CHI-SQ.(   6.7 DF= 1 SIG.= 0.010
    OVERALL CHI-SQ=  13.9 DF=  7  SIG.= 0.053

0   ISSUE GROUP =   1   ISSUE =   2   DC COMMON MODE

    LEVEL 1 NO.<MED.= 12 NO. EXP.=  7     NO.>=MED.=  3 NO. EXP.=  8   CHI-SQ.(   6.7 DF= 1 SIG.= 0.010
    LEVEL 2 NO.<MED.= 40 NO. EXP.= 30     NO.>=MED.= 20 NO. EXP.= 30   CHI-SQ.(   6.7 DF= 1 SIG.= 0.010
    LEVEL 3 NO.<MED.= 22 NO. EXP.= 30     NO.>=MED.= 38 NO. EXP.= 30   CHI-SQ.(   4.3 DF= 1 SIG.= 0.039
    LEVEL 4 NO.<MED.=  0 NO. EXP.=  7     NO.>=MED.= 15 NO. EXP.=  8   CHI-SQ.(  13.1 DF= 1 SIG.= 0.000
    OVERALL CHI-SQ=  30.8 DF=  7  SIG.= 0.000

0   ISSUE GROUP =   1   ISSUE =   3   FAILURE TO VENT

    LEVEL 1 NO.<MED.= 10 NO. EXP.=  7     NO.>=MED.=  5 NO. EXP.=  8   CHI-SQ.(   2.4 DF= 1 SIG.= 0.120
    LEVEL 2 NO.<MED.= 33 NO. EXP.= 30     NO.>=MED.= 27 NO. EXP.= 30   CHI-SQ.(   0.6 DF= 1 SIG.= 0.439
    LEVEL 3 NO.<MED.= 27 NO. EXP.= 30     NO.>=MED.= 33 NO. EXP.= 30   CHI-SQ.(   0.6 DF= 1 SIG.= 0.439
    LEVEL 4 NO.<MED.=  4 NO. EXP.=  7     NO.>=MED.= 11 NO. EXP.=  8   CHI-SQ.(   2.4 DF= 1 SIG.= 0.120
    OVERALL CHI-SQ=   6.0 DF=  7  SIG.= 0.527

0   ISSUE GROUP =   1   ISSUE =   4   SW MOD A VS. MOD B

    LEVEL 1 NO.<MED.= 43 NO. EXP.= 44     NO.>=MED.= 45 NO. EXP.= 44   CHI-SQ.(   0.0 DF= 1 SIG.= 0.831
    LEVEL 2 NO.<MED.= 31 NO. EXP.= 31     NO.>=MED.= 31 NO. EXP.= 31   CHI-SQ.(   0.0 DF= 1 SIG.= 1.000
    OVERALL CHI-SQ=   0.0 DF=  3  SIG.= 0.997

0   ISSUE GROUP =   1   ISSUE =   5   POWER RECOVERY

    LEVEL 1 NO.<MED.= 11 NO. EXP.=  7     NO.>=MED.=  4 NO. EXP.=  8   CHI-SQ.(   4.3 DF= 1 SIG.= 0.038
    LEVEL 2 NO.<MED.= 31 NO. EXP.= 30     NO.>=MED.= 29 NO. EXP.= 30   CHI-SQ.(   0.1 DF= 1 SIG.= 0.796
    LEVEL 3 NO.<MED.= 28 NO. EXP.= 30     NO.>=MED.= 32 NO. EXP.= 30   CHI-SQ.(   0.3 DF= 1 SIG.= 0.606
    LEVEL 4 NO.<MED.=  4 NO. EXP.=  7     NO.>=MED.= 11 NO. EXP.=  8   CHI-SQ.(   2.4 DF= 1 SIG.= 0.120
    OVERALL CHI-SQ=   7.0 DF=  7  SIG.= 0.426

0   ISSUE GROUP =   2   ISSUE =   1   PROB. OF STUCK OPEN VAC. BRKR.

    LEVEL 1 NO.<MED.=  9 NO. EXP.=  7     NO.>=MED.=  6 NO. EXP.=  8   CHI-SQ.(   1.1 DF= 1 SIG.= 0.301
    LEVEL 2 NO.<MED.= 29 NO. EXP.= 30     NO.>=MED.= 31 NO. EXP.= 30   CHI-SQ.(   0.1 DF= 1 SIG.= 0.796
    LEVEL 3 NO.<MED.= 28 NO. EXP.= 30     NO.>=MED.= 32 NO. EXP.= 30   CHI-SQ.(   0.3 DF= 1 SIG.= 0.606
    LEVEL 4 NO.<MED.=  8 NO. EXP.=  7     NO.>=MED.=  7 NO. EXP.=  8   CHI-SQ.(   0.3 DF= 1 SIG.= 0.605
    OVERALL CHI-SQ=   1.7 DF=  7  SIG.= 0.976

0   ISSUE GROUP =   2   ISSUE =   2   HPSW-SPRAY

    LEVEL 1 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.(   0.0 DF= 1 SIG.= 1.000
     LEVEL 2 NO.<MED.= 26 NO. EXP.= 30     NO.>=MED.= 34 NO. EXP.= 30   CHI-SQ.(   1.1 DF= 1 SIG.= 0.302
     LEVEL 3 NO.<MED.= 34 NO. EXP.= 30     NO.>=MED.= 26 NO. EXP.= 30   CHI-SQ.(   1.1 DF= 1 SIG.= 0.302
     LEVEL 4 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.(   0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   2.1 DF=  7  SIG.= 0.952

0    ISSUE GROUP =   2   ISSUE =   3   VENT-SBO-HACR

     LEVEL 1 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.(   0.0 DF= 1 SIG.= 1.000
     LEVEL 2 NO.<MED.= 28 NO. EXP.= 30     NO.>=MED.= 32 NO. EXP.= 30   CHI-SQ.(   0.3 DF= 1 SIG.= 0.606
     LEVEL 3 NO.<MED.= 32 NO. EXP.= 30     NO.>=MED.= 28 NO. EXP.= 30   CHI-SQ.(   0.3 DF= 1 SIG.= 0.606
     LEVEL 4 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.(   0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   0.5 DF=  7  SIG.= 0.999

0    ISSUE GROUP =   2   ISSUE =   4   VENT-SBO-ACR

     LEVEL 1 NO.<MED.=  9 NO. EXP.=  7     NO.>=MED.=  6 NO. EXP.=  8   CHI-SQ.(   1.1 DF= 1 SIG.= 0.301
     LEVEL 2 NO.<MED.= 29 NO. EXP.= 30     NO.>=MED.= 31 NO. EXP.= 30   CHI-SQ.(   0.1 DF= 1 SIG.= 0.796
     LEVEL 3 NO.<MED.= 29 NO. EXP.= 30     NO.>=MED.= 31 NO. EXP.= 30   CHI-SQ.(   0.1 DF= 1 SIG.= 0.796
     LEVEL 4 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.(   0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   1.2 DF=  7  SIG.= 0.991

0    ISSUE GROUP =   2   ISSUE =   5   SP BYPASS, SMALL/LARGE

     LEVEL 1 NO.<MED.= 63 NO. EXP.= 63     NO.>=MED.= 63 NO. EXP.= 63   CHI-SQ.(   0.0 DF= 1 SIG.= 1.000
     LEVEL 2 NO.<MED.= 11 NO. EXP.= 12     NO.>=MED.= 13 NO. EXP.= 12   CHI-SQ.(   0.2 DF= 1 SIG.= 0.683
     OVERALL CHI-SQ=   0.2 DF=  3  SIG.= 0.983

0    ISSUE GROUP =   2   ISSUE =   6   CONT FAILURE PRESS. (T<500F B VB)

     LEVEL 1 NO.<MED.=  1 NO. EXP.=  1     NO.>=MED.=  1 NO. EXP.=  1  TEST CANNOT BE RUN; EXP. NO. < 3
     LEVEL 2 NO.<MED.=  6 NO. EXP.=  5     NO.>=MED.=  5 NO. EXP.=  6   CHI-SQ.(   0.4 DF= 1 SIG.= 0.545
     LEVEL 3 NO.<MED.=  8 NO. EXP.= 10     NO.>=MED.= 12 NO. EXP.= 10   CHI-SQ.(   0.8 DF= 1 SIG.= 0.371
     LEVEL 4 NO.<MED.=  4 NO. EXP.=  4     NO.>=MED.=  5 NO. EXP.=  5   CHI-SQ.(   0.0 DF= 1 SIG.= 1.000
     LEVEL 5 NO.<MED.=  7 NO. EXP.= 11     NO.>=MED.= 15 NO. EXP.= 11   CHI-SQ.(   2.9 DF= 1 SIG.= 0.088
     LEVEL 6 NO.<MED.= 22 NO. EXP.= 19     NO.>=MED.= 16 NO. EXP.= 19   CHI-SQ.(   0.9 DF= 1 SIG.= 0.330
     LEVEL 7 NO.<MED.= 10 NO. EXP.= 10     NO.>=MED.= 10 NO. EXP.= 10   CHI-SQ.(   0.0 DF= 1 SIG.= 1.000
     LEVEL 8 NO.<MED.=  9 NO. EXP.=  8     NO.>=MED.=  7 NO. EXP.=  8   CHI-SQ.(   0.3 DF= 1 SIG.= 0.617
     LEVEL 9 NO.<MED.=  7 NO. EXP.=  6     NO.>=MED.=  5 NO. EXP.=  6   CHI-SQ.(   0.3 DF= 1 SIG.= 0.564
     OVERALL CHI-SQ=   5.6 DF= 15  SIG.= 0.986

0    ISSUE GROUP =   2   ISSUE =   7   LATE FAILURE LOCATION (800-1200 A VB)

     LEVEL 1 NO.<MED.=  2 NO. EXP.=  2     NO.>=MED.=  3 NO. EXP.=  3   TEST CANNOT BE RUN; EXP. NO. < 3
     LEVEL 2 NO.<MED.= 48 NO. EXP.= 47     NO.>=MED.= 46 NO. EXP.= 47   CHI-SQ.(   0.0 DF= 1 SIG.= 0.837
     LEVEL 3 NO.<MED.= 24 NO. EXP.= 25     NO.>=MED.= 27 NO. EXP.= 26   CHI-SQ.(   0.1 DF= 1 SIG.= 0.779
     OVERALL CHI-SQ=   0.1 DF=  3  SIG.= 0.989

0    ISSUE GROUP =   2   ISSUE =   8   CONT FAILURE SIZE, RAPID PRESS.
```

```
      LEVEL 1 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8   CHI-SQ.(   0.3 DF= 1 SIG.= 0.605

      LEVEL 2 NO.<MED.= 68 NO. EXP.= 67     NO.>=MED.= 67 NO. EXP.= 68   CHI-SQ.(   0.0 DF= 1 SIG.= 0.863

      OVERALL CHI-SQ=   0.3 DF=  3  SIG.= 0.961

0     ISSUE GROUP =   2   ISSUE =   9   CONT FAILURE SIZE, SLOW PRESS.

      LEVEL 1 NO.<MED.= 35 NO. EXP.= 37     NO.>=MED.= 40 NO. EXP.= 38   CHI-SQ.(   0.2 DF= 1 SIG.= 0.644

      LEVEL 2 NO.<MED.= 39 NO. EXP.= 37     NO.>=MED.= 36 NO. EXP.= 38   CHI-SQ.(   0.2 DF= 1 SIG.= 0.644

      OVERALL CHI-SQ=   0.4 DF=  3  SIG.= 0.935

0     ISSUE GROUP =   2   ISSUE =  10   VB MODE, HIGH-P FLOW MELT

      LEVEL 1 NO.<MED.= 40 NO. EXP.= 37     NO.>=MED.= 35 NO. EXP.= 38   CHI-SQ.(   0.5 DF= 1 SIG.= 0.488

      LEVEL 2 NO.<MED.= 34 NO. EXP.= 37     NO.>=MED.= 41 NO. EXP.= 38   CHI-SQ.(   0.5 DF= 1 SIG.= 0.488

      OVERALL CHI-SQ=   1.0 DF=  3  SIG.= 0.811

0     ISSUE GROUP =   2   ISSUE =  11   CONT PRESS. BEFORE VB, LONG TERM TB

      LEVEL 1 NO.<MED.= 11 NO. EXP.=  8     NO.>=MED.=  5 NO. EXP.=  8   CHI-SQ.(   2.3 DF= 1 SIG.= 0.134

      LEVEL 2 NO.<MED.= 38 NO. EXP.= 40     NO.>=MED.= 42 NO. EXP.= 40   CHI-SQ.(   0.2 DF= 1 SIG.= 0.655

      LEVEL 3 NO.<MED.= 22 NO. EXP.= 25     NO.>=MED.= 28 NO. EXP.= 25   CHI-SQ.(   0.7 DF= 1 SIG.= 0.396

      LEVEL 4 NO.<MED.=  3 NO. EXP.=  2     NO.>=MED.=  1 NO. EXP.=  2   TEST CANNOT BE RUN; EXP. NO. < 3

      OVERALL CHI-SQ=   3.2 DF=  5  SIG.= 0.674

0     ISSUE GROUP =   2   ISSUE =  12   PRESSURE RISE AT VB

      LEVEL 1 NO.<MED.= 15 NO. EXP.= 15     NO.>=MED.= 15 NO. EXP.= 15   CHI-SQ.(   0.0 DF= 1 SIG.= 1.000

      LEVEL 2 NO.<MED.= 25 NO. EXP.= 22     NO.>=MED.= 20 NO. EXP.= 23   CHI-SQ.(   0.8 DF= 1 SIG.= 0.371

      LEVEL 3 NO.<MED.= 21 NO. EXP.= 19     NO.>=MED.= 17 NO. EXP.= 19   CHI-SQ.(   0.4 DF= 1 SIG.= 0.516

      LEVEL 4 NO.<MED.=  9 NO. EXP.= 11     NO.>=MED.= 13 NO. EXP.= 11   CHI-SQ.(   0.7 DF= 1 SIG.= 0.394

      LEVEL 5 NO.<MED.=  4 NO. EXP.=  7     NO.>=MED.= 11 NO. EXP.=  8   CHI-SQ.(   2.4 DF= 1 SIG.= 0.120

      OVERALL CHI-SQ=   4.4 DF=  9  SIG.= 0.886

0     ISSUE GROUP =   2   ISSUE =  13   DELTA P DUE TO SUMP WATER INTERACT.

      LEVEL 1 NO.<MED.= 26 NO. EXP.= 30     NO.>=MED.= 34 NO. EXP.= 30   CHI-SQ.(   1.1 DF= 1 SIG.= 0.302

      LEVEL 2 NO.<MED.= 41 NO. EXP.= 37     NO.>=MED.= 34 NO. EXP.= 38   CHI-SQ.(   0.9 DF= 1 SIG.= 0.356

      LEVEL 3 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.(   0.0 DF= 1 SIG.= 1.000

      OVERALL CHI-SQ=   1.9 DF=  5  SIG.= 0.860

0     ISSUE GROUP =   2   ISSUE =  14   PROB OF DRY DW MELT THROUGH

      LEVEL 1 NO.<MED.= 25 NO. EXP.= 37     NO.>=MED.= 50 NO. EXP.= 38   CHI-SQ.(   7.7 DF= 1 SIG.= 0.006

      LEVEL 2 NO.<MED.= 49 NO. EXP.= 37     NO.>=MED.= 26 NO. EXP.= 38   CHI-SQ.(   7.7 DF= 1 SIG.= 0.006

      OVERALL CHI-SQ=  15.4 DF=  3  SIG.= 0.002

0     ISSUE GROUP =   2   ISSUE =  15   PROB OF WET DW MELT THROUGH

      LEVEL 1 NO.<MED.= 27 NO. EXP.= 30     NO.>=MED.= 33 NO. EXP.= 30   CHI-SQ.(   0.6 DF= 1 SIG.= 0.439

      LEVEL 2 NO.<MED.= 47 NO. EXP.= 45     NO.>=MED.= 43 NO. EXP.= 45   CHI-SQ.(   0.2 DF= 1 SIG.= 0.673
     OVERALL CHI-SQ=   0.8 DF=  3  SIG.= 0.855

0    ISSUE GROUP =   2   ISSUE =  16   PROB OF DW M-THRU W/HI-P MELT EJECT

     LEVEL 1 NO.<MED.= 34 NO. EXP.= 37     NO.>=MED.= 41 NO. EXP.= 38   CHI-SQ.(   0.5 DF= 1 SIG.= 0.488
     LEVEL 2 NO.<MED.= 40 NO. EXP.= 37     NO.>=MED.= 35 NO. EXP.= 38   CHI-SQ.(   0.5 DF= 1 SIG.= 0.488
     OVERALL CHI-SQ=   1.0 DF=  3  SIG.= 0.811

0    ISSUE GROUP =   2   ISSUE =  17   PROB OF H2 BURNS IN RB LEADING TO BP

     LEVEL 1 NO.<MED.=  9 NO. EXP.= 15     NO.>=MED.= 21 NO. EXP.= 15   CHI-SQ.(   4.8 DF= 1 SIG.= 0.028
     LEVEL 2 NO.<MED.= 65 NO. EXP.= 60     NO.>=MED.= 55 NO. EXP.= 60   CHI-SQ.(   0.8 DF= 1 SIG.= 0.361
     OVERALL CHI-SQ=   5.6 DF=  3  SIG.= 0.131

0    ISSUE GROUP =   3   ISSUE =   1   IN-VES RELEASE FROM FUEL

     LEVEL 1 NO.<MED.= 15 NO. EXP.= 17     NO.>=MED.= 19 NO. EXP.= 17   CHI-SQ.(   0.5 DF= 1 SIG.= 0.493
     LEVEL 2 NO.<MED.= 41 NO. EXP.= 37     NO.>=MED.= 33 NO. EXP.= 37   CHI-SQ.(   0.9 DF= 1 SIG.= 0.352
     LEVEL 3 NO.<MED.= 16 NO. EXP.= 19     NO.>=MED.= 23 NO. EXP.= 20   CHI-SQ.(   0.9 DF= 1 SIG.= 0.336
     LEVEL 4 NO.<MED.=  2 NO. EXP.=  1     NO.>=MED.=  1 NO. EXP.=  2  TEST CANNOT BE RUN; EXP. NO. < 3
     OVERALL CHI-SQ=   2.3 DF=  5  SIG.= 0.812

0    ISSUE GROUP =   3   ISSUE =   2   CSI DECOMP

     LEVEL 1 NO.<MED.= 19 NO. EXP.= 14     NO.>=MED.= 10 NO. EXP.= 15   CHI-SQ.(   3.5 DF= 1 SIG.= 0.063
     LEVEL 2 NO.<MED.= 20 NO. EXP.= 27     NO.>=MED.= 35 NO. EXP.= 28   CHI-SQ.(   3.6 DF= 1 SIG.= 0.059
     LEVEL 3 NO.<MED.= 26 NO. EXP.= 25     NO.>=MED.= 25 NO. EXP.= 26   CHI-SQ.(   0.1 DF= 1 SIG.= 0.779
     LEVEL 4 NO.<MED.=  9 NO. EXP.=  7     NO.>=MED.=  6 NO. EXP.=  8   CHI-SQ.(   1.1 DF= 1 SIG.= 0.301
     OVERALL CHI-SQ=   8.2 DF=  7  SIG.= 0.318

0    ISSUE GROUP =   3   ISSUE =   3   FRAC IN-VES RETENTION LEAKED, AT VB

     LEVEL 1 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  7 NO. EXP.=  7   CHI-SQ.(   0.0 DF= 1 SIG.= 1.000
     LEVEL 2 NO.<MED.= 26 NO. EXP.= 29     NO.>=MED.= 32 NO. EXP.= 29   CHI-SQ.(   0.6 DF= 1 SIG.= 0.431
     LEVEL 3 NO.<MED.= 18 NO. EXP.= 18     NO.>=MED.= 18 NO. EXP.= 18   CHI-SQ.(   0.0 DF= 1 SIG.= 1.000
     LEVEL 4 NO.<MED.= 20 NO. EXP.= 17     NO.>=MED.= 15 NO. EXP.= 18   CHI-SQ.(   1.0 DF= 1 SIG.= 0.310
     LEVEL 5 NO.<MED.=  3 NO. EXP.=  3     NO.>=MED.=  4 NO. EXP.=  4   CHI-SQ.(   0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   1.7 DF=  9  SIG.= 0.996

0    ISSUE GROUP =   3   ISSUE =   4   S POOL DF

     LEVEL 1 NO.<MED.= 10 NO. EXP.=  7     NO.>=MED.=  5 NO. EXP.=  8   CHI-SQ.(   2.4 DF= 1 SIG.= 0.120
     LEVEL 2 NO.<MED.= 42 NO. EXP.= 38     NO.>=MED.= 34 NO. EXP.= 38   CHI-SQ.(   0.8 DF= 1 SIG.= 0.359
     LEVEL 3 NO.<MED.= 13 NO. EXP.= 15     NO.>=MED.= 17 NO. EXP.= 15   CHI-SQ.(   0.5 DF= 1 SIG.= 0.465
     LEVEL 4 NO.<MED.=  6 NO. EXP.= 12     NO.>=MED.= 18 NO. EXP.= 12   CHI-SQ.(   6.0 DF= 1 SIG.= 0.014
     LEVEL 5 NO.<MED.=  3 NO. EXP.=  2     NO.>=MED.=  2 NO. EXP.=  3  TEST CANNOT BE RUN; EXP. NO. < 3
     OVERALL CHI-SQ=   9.8 DF=  7  SIG.= 0.201

0    ISSUE GROUP =   3   ISSUE =   5   S POOL DF, VOL I
```

```
     LEVEL 1 NO.<MED.=  3 NO. EXP.=  2     NO.>=MED.=  1 NO. EXP.=  2   TEST CANNOT BE RUN; EXP. NO. < 3
     LEVEL 2 NO.<MED.= 23 NO. EXP.= 17     NO.>=MED.= 12 NO. EXP.= 18   CHI-SQ.(   4.1 DF= 1 SIG.= 0.042
     LEVEL 3 NO.<MED.= 24 NO. EXP.= 23     NO.>=MED.= 22 NO. EXP.= 23   CHI-SQ.(   0.1 DF= 1 SIG.= 0.768
     LEVEL 4 NO.<MED.= 20 NO. EXP.= 25     NO.>=MED.= 30 NO. EXP.= 25   CHI-SQ.(   2.0 DF= 1 SIG.= 0.157
     LEVEL 5 NO.<MED.=  4 NO. EXP.=  7     NO.>=MED.= 11 NO. EXP.=  8   CHI-SQ.(   2.4 DF= 1 SIG.= 0.120
     OVERALL CHI-SQ=   8.6 DF=  7  SIG.= 0.281

0    ISSUE GROUP =   3   ISSUE =   6   REVOL FROM RPV (FRVOL)

     LEVEL 1 NO.<MED.=  2 NO. EXP.=  2     NO.>=MED.=  2 NO. EXP.=  2   TEST CANNOT BE RUN; EXP. NO. < 3
     LEVEL 2 NO.<MED.= 23 NO. EXP.= 23     NO.>=MED.= 24 NO. EXP.= 24   CHI-SQ.(   0.0 DF= 1 SIG.= 1.000
     LEVEL 3 NO.<MED.= 38 NO. EXP.= 38     NO.>=MED.= 38 NO. EXP.= 38   CHI-SQ.(   0.0 DF= 1 SIG.= 1.000
     LEVEL 4 NO.<MED.= 11 NO. EXP.= 11     NO.>=MED.= 12 NO. EXP.= 12   CHI-SQ.(   0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   0.0 DF=  5  SIG.= 1.000

0    ISSUE GROUP =   3   ISSUE =   7   CCI REL

     LEVEL 1 NO.<MED.= 11 NO. EXP.=  9     NO.>=MED.=  7 NO. EXP.=  9   CHI-SQ.(   0.9 DF= 1 SIG.= 0.346
     LEVEL 2 NO.<MED.= 31 NO. EXP.= 31     NO.>=MED.= 31 NO. EXP.= 31   CHI-SQ.(   0.0 DF= 1 SIG.= 1.000
     LEVEL 3 NO.<MED.= 25 NO. EXP.= 27     NO.>=MED.= 30 NO. EXP.= 28   CHI-SQ.(   0.3 DF= 1 SIG.= 0.590
     LEVEL 4 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.(   0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   1.2 DF=  7  SIG.= 0.991

0    ISSUE GROUP =   3   ISSUE =   8   RB DF

     LEVEL 1 NO.<MED.= 17 NO. EXP.= 12     NO.>=MED.=  8 NO. EXP.= 13   CHI-SQ.(   4.0 DF= 1 SIG.= 0.045
     LEVEL 2 NO.<MED.= 30 NO. EXP.= 29     NO.>=MED.= 28 NO. EXP.= 29   CHI-SQ.(   0.1 DF= 1 SIG.= 0.793
     LEVEL 3 NO.<MED.= 21 NO. EXP.= 26     NO.>=MED.= 31 NO. EXP.= 26   CHI-SQ.(   1.9 DF= 1 SIG.= 0.166
     LEVEL 4 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8   CHI-SQ.(   0.3 DF= 1 SIG.= 0.605
     OVERALL CHI-SQ=   6.3 DF=  7  SIG.= 0.509

0    ISSUE GROUP =   3   ISSUE =   9   REF BAY DF

     LEVEL 1 NO.<MED.=  8 NO. EXP.=  6     NO.>=MED.=  4 NO. EXP.=  6   CHI-SQ.(   1.3 DF= 1 SIG.= 0.248
     LEVEL 2 NO.<MED.= 13 NO. EXP.= 13     NO.>=MED.= 14 NO. EXP.= 14   CHI-SQ.(   0.0 DF= 1 SIG.= 1.000
     LEVEL 3 NO.<MED.= 29 NO. EXP.= 28     NO.>=MED.= 28 NO. EXP.= 29   CHI-SQ.(   0.1 DF= 1 SIG.= 0.791
     LEVEL 4 NO.<MED.= 24 NO. EXP.= 27     NO.>=MED.= 30 NO. EXP.= 27   CHI-SQ.(   0.7 DF= 1 SIG.= 0.414
     OVERALL CHI-SQ=   2.1 DF=  7  SIG.= 0.956

0    ISSUE GROUP =   3   ISSUE =  10   LATE RELEASE FRACT, IODINE

     LEVEL 1 NO.<MED.=  4 NO. EXP.=  3     NO.>=MED.=  3 NO. EXP.=  4   CHI-SQ.(   0.0 DF= 1 SIG.= 1.000
     LEVEL 2 NO.<MED.= 26 NO. EXP.= 24     NO.>=MED.= 23 NO. EXP.= 25   CHI-SQ.(   0.3 DF= 1 SIG.= 0.568
     LEVEL 3 NO.<MED.= 35 NO. EXP.= 36     NO.>=MED.= 38 NO. EXP.= 37   CHI-SQ.(   0.1 DF= 1 SIG.= 0.815
     LEVEL 4 NO.<MED.=  9 NO. EXP.= 10     NO.>=MED.= 12 NO. EXP.= 11   CHI-SQ.(   0.2 DF= 1 SIG.= 0.662
     OVERALL CHI-SQ=   0.6 DF=  7  SIG.= 0.999
```

CONSEQUENCE MEASURE:
LATENT CANCERS

BASE CASE :
PEACH BOTTOM LLH (CRAC2)

ISSUE LEVELS FOR EACH SAMPLE MEMBER, IN ORDER OF INCREASING RISK

ISSUE LEVELS, FOR ALL ISSUES

RISK	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
2.831E-05	2	2	2	1	1	2	3	3	4	1	6	3	2	2	2	1	2	1	2	2	2	2	2	2	2	2	4	3	3	2	2	2
6.518E-05	2	2	3	1	1	3	2	3	2	1	6	2	2	2	1	3	5	2	1	1	1	2	2	3	5	4	3	3	1	2	4	2
8.112E-05	2	1	2	2	1	4	1	3	3	1	3	3	1	2	2	2	2	2	2	1	2	2	1	2	2	3	4	3	2	1	4	3
9.306E-05	3	2	2	1	3	3	3	2	3	1	5	3	2	2	2	1	2	3	2	2	2	2	2	1	4	2	4	3	2	2	4	1
1.031E-04	2	2	2	2	2	2	3	3	3	1	8	2	2	1	1	2	2	1	2	2	1	2	1	2	1	2	3	2	1	1	4	3
1.201E-04	3	2	3	2	1	2	3	2	2	1	7	2	2	2	1	3	1	2	2	1	1	1	3	3	2	2	1	2	2	2	4	3
1.403E-04	3	2	3	2	3	2	4	3	1	1	8	3	1	2	2	3	4	2	2	2	1	2	2	2	4	2	2	2	2	2	1	2
1.802E-04	2	2	2	1	2	2	2	3	3	1	9	2	2	2	1	2	4	2	2	2	2	2	1	2	4	5	4	2	2	2	4	3
1.900E-04	3	1	3	2	4	2	1	3	3	1	7	3	2	2	2	1	3	1	2	1	1	2	2	2	2	2	3	4	2	2	3	2
2.133E-04	3	3	3	1	1	1	2	2	3	1	4	3	2	1	2	2	2	2	2	1	2	2	3	1	2	2	2	3	1	2	4	3
2.138E-04	2	2	2	2	2	2	2	2	3	1	6	2	2	1	1	1	1	1	2	2	1	2	2	1	2	4	2	3	3	2	1	3
2.358E-04	3	2	1	1	2	2	3	2	1	1	1	3	2	1	1	1	2	1	1	2	1	2	2	4	3	4	4	3	2	1	3	3
2.566E-04	4	2	3	2	2	3	3	1	2	2	7	2	2	2	1	2	1	2	2	2	1	2	2	3	3	3	2	3	3	1	4	3
2.594E-04	3	3	2	2	3	3	3	1	1	1	9	3	2	1	1	1	3	2	2	1	2	2	1	3	2	3	4	2	2	1	2	1
2.690E-04	2	2	3	2	3	4	2	3	3	1	6	2	2	1	2	4	1	2	2	2	1	1	2	4	2	2	3	2	1	2	3	2
2.764E-04	2	2	2	2	2	1	3	3	2	1	6	3	2	2	2	2	2	2	1	2	2	2	2	2	4	2	4	2	2	2	3	3
2.775E-04	3	3	1	1	1	2	3	4	3	1	6	2	2	2	2	2	1	2	2	2	2	2	2	3	4	2	3	2	3	2	2	3
2.784E-04	3	2	3	1	1	3	3	4	2	1	5	3	2	1	1	2	3	2	1	2	1	2	3	3	1	2	3	3	1	3	4	3
2.875E-04	3	3	2	1	1	2	3	3	2	1	6	2	2	1	2	2	2	2	2	2	2	2	2	4	3	2	4	4	1	1	1	2
2.999E-04	2	3	1	1	3	3	3	4	3	2	5	2	2	1	2	3	3	2	1	2	2	2	3	2	4	2	3	3	2	1	3	2
3.138E-04	2	2	2	1	2	4	3	3	2	1	8	2	2	2	2	3	2	1	2	2	1	2	3	1	3	2	4	4	3	1	3	4
3.398E-04	2	2	3	2	2	3	3	4	4	1	6	2	2	2	1	1	2	2	2	2	2	2	2	3	2	2	3	3	3	1	3	4
3.420E-04	3	1	2	2	1	2	1	2	1	1	8	3	2	1	2	3	4	2	2	2	1	2	3	2	3	1	2	2	4	4	4	3
3.596E-04	2	1	3	2	2	4	3	2	2	1	7	2	2	1	2	1	3	1	1	1	2	1	3	1	2	4	1	2	2	2	4	3
3.691E-04	2	2	2	1	4	2	2	3	2	1	7	3	2	1	2	1	1	2	2	2	1	2	2	3	4	2	3	3	3	2	4	4
4.383E-04	3	3	2	1	2	2	2	3	2	1	6	2	2	1	2	2	1	1	2	1	2	2	1	2	2	2	3	3	2	3	3	2
4.394E-04	3	2	1	1	3	1	1	3	4	1	9	2	2	2	2	2	4	2	2	2	1	2	2	2	2	4	2	3	2	3	3	2
4.563E-04	3	2	2	1	1	1	3	2	2	1	5	2	2	2	1	3	4	2	1	2	1	2	2	2	3	3	5	2	2	2	4	4
4.757E-04	1	3	2	1	3	3	4	2	3	1	3	3	2	1	2	2	2	3	2	2	2	2	2	1	2	2	3	2	1	3	3	2
4.781E-04	1	3	3	1	2	3	2	1	3	1	6	2	2	2	2	3	5	3	2	1	1	2	2	4	4	3	4	3	3	1	1	3
4.904E-04	1	2	2	1	2	2	3	3	3	1	5	2	2	2	1	2	4	1	2	1	2	1	4	4	1	5	3	3	3	2	1	2
4.950E-04	2	3	3	1	3	2	2	3	4	2	8	2	2	1	2	3	2	1	2	1	1	2	2	2	2	4	4	2	2	2	4	2
5.148E-04	1	3	3	2	1	3	2	2	3	2	3	2	2	1	2	3	3	1	1	1	2	2	2	4	4	2	2	3	3	1	3	2
5.264E-04	2	3	3	1	1	3	2	3	3	2	7	2	2	2	1	2	2	2	2	2	1	2	2	3	4	1	3	3	2	3	4	3
5.460E-04	2	2	2	1	2	3	1	3	3	1	3	2	2	2	1	3	2	2	2	2	1	2	1	3	3	2	2	2	3	4	3	3
5.470E-04	3	1	2	1	2	3	1	4	2	1	2	2	2	1	1	2	3	2	2	1	2	1	2	1	2	2	3	2	2	2	2	4
5.724E-04	3	2	3	1	3	4	3	2	2	2	8	2	2	1	2	2	2	1	2	1	2	2	1	3	5	3	2	3	1	3	3	4
5.921E-04	3	2	1	2	3	2	3	2	3	1	2	3	1	1	2	3	3	1	2	2	2	2	2	3	1	2	2	3	2	3	3	3
6.071E-04	2	3	3	2	2	2	2	2	2	1	2	3	2	1	2	3	2	2	2	2	2	2	2	2	5	2	2	3	4	2	2	3
6.146E-04	1	2	2	2	2	2	3	2	2	1	4	3	2	2	1	3	2	2	1	2	1	2	2	1	3	1	2	3	4	3	4	2
6.169E-04	3	2	3	1	2	2	3	3	4	1	6	2	2	2	1	4	4	2	2	1	2	2	3	3	3	2	3	2	3	2	3	4
6.205E-04	4	2	4	2	1	3	3	2	3	1	6	3	2	1	2	3	1	2	2	2	1	2	1	3	1	4	4	4	3	4	3	2
6.453E-04	3	2	2	1	2	4	2	3	3	1	8	3	2	1	2	2	1	1	1	2	2	2	3	1	4	3	4	3	3	2	3	3
6.496E-04	1	1	3	2	2	3	4	2	2	1	2	2	2	2	2	1	3	2	1	2	1	1	2	2	3	3	3	2	2	3	2	3
6.502E-04	3	2	2	1	3	2	3	3	4	1	7	2	1	1	1	2	3	2	2	2	2	2	3	3	4	4	2	3	3	3	3	1
6.580E-04	4	3	3	1	3	2	3	1	3	2	6	3	2	2	2	3	3	1	2	2	2	2	1	1	3	2	2	2	3	2	2	2
6.722E-04	3	3	1	2	2	3	2	2	1	1	6	1	1	1	1	4	3	2	2	2	2	2	2	1	3	1	4	2	1	3	4	2
6.780E-04	3	3	4	2	2	3	2	3	2	1	7	2	1	1	1	2	1	2	2	1	1	2	2	4	3	2	2	1	2	3	2	3
6.819E-04	1	1	2	1	2	2	4	2	2	2	6	2	2	2	1	2	4	1	1	1	2	2	2	3	4	3	4	4	4	4	3	3
6.959E-04	4	3	3	2	2	3	3	1	2	1	4	2	1	1	2	2	5	1	2	2	1	2	3	2	2	2	4	2	3	1	4	3
7.002E-04	2	1	3	2	2	1	2	3	4	1	5	2	2	2	1	2	2	3	1	2	2	2	2	3	1	2	3	3	4	2	4	2
7.041E-04	1	1	3	1	2	3	4	2	2	1	3	3	2	1	2	2	2	1	1	2	1	2	2	1	2	2	2	2	3	3	3	3
7.085E-04	4	2	1	2	2	3	2	1	4	1	4	3	2	1	1	2	1	2	1	1	1	1	3	2	4	3	4	4	2	4	4	3
7.257E-04	3	2	3	2	3	2	3	4	2	1	8	2	2	2	1	2	3	1	2	1	1	2	1	3	4	2	5	3	3	2	3	3
7.341E-04	3	2	3	2	2	2	3	2	1	1	5	3	2	2	1	2	2	2	2	2	1	1	2	2	4	4	4	3	2	1	4	3
7.488E-04	2	3	2	1	2	4	3	2	3	2	6	2	2	1	1	2	1	1	2	1	2	2	1	3	4	1	4	4	2	2	3	2
7.563E-04	3	2	4	1	3	3	3	2	3	2	2	2	2	2	1	3	3	1	2	2	1	2	3	1	4	3	5	1	2	3	4	3
8.106E-04	3	1	2	1	2	3	2	2	2	2	5	2	2	1	2	2	3	2	2	1	2	2	3	2	2	4	3	3	3	3	3	4
8.136E-04	2	2	3	2	2	3	4	2	2	1	9	3	2	2	1	3	3	2	1	1	1	2	1	1	4	3	4	2	2	4	1	2
8.201E-04	3	3	2	1	3	3	1	1	4	1	5	3	2	1	2	2	3	1	2	2	2	2	2	3	1	2	4	3	3	1	2	3
8.266E-04	3	3	1	1	2	3	4	3	3	1	3	3	2	2	1	2	2	1	1	2	1	2	2	2	2	2	2	3	3	1	4	3
8.393E-04	3	2	1	2	3	3	3	3	3	2	5	2	2	1	1	2	5	2	2	2	1	2	2	2	2	2	3	2	2	2	2	3
8.477E-04	3	2	2	1	2	3	3	2	3	1	9	2	2	1	1	2	1	2	1	2	2	1	1	4	4	2	3	3	3	2	3	2
8.485E-04	2	2	4	1	4	2	3	3	3	1	6	2	2	2	1	3	2	2	2	2	1	2	1	1	2	2	2	3	2	1	4	3
8.550E-04	2	2	2	2	2	3	3	2	2	1	9	2	2	2	1	2	3	2	1	2	2	2	2	3	1	3	5	3	3	3	4	4
8.793E-04	4	3	3	1	2	3	3	3	2	1	6	2	2	1	2	2	2	1	2	1	2	2	2	3	3	4	2	3	3	2	2	3
9.112E-04	2	2	3	1	3	3	2	1	3	1	5	2	2	2	2	2	3	1	1	2	2	2	1	3	1	2	5	3	1	2	3	1
9.331E-04	3	2	2	1	3	3	3	4	2	1	6	2	2	1	2	3	1	2	1	1	1	2	3	3	3	1	5	3	3	1	3	4
9.642E-04	2	3	1	2	3	3	2	3	2	1	4	2	2	2	1	2	2	2	2	1	1	2	3	3	2	3	3	3	4	1	3	2
9.791E-04	2	3	2	2	3	2	2	2	2	1	4	1	2	2	2	1	3	2	2	1	1	2	2	1	4	2	2	3	2	2	3	4
1.037E-03	4	2	1	1	2	4	1	1	4	1	8	3	2	2	2	1	3	2	1	1	1	2	2	2	4	2	4	3	1	3	2	3
1.077E-03	2	1	4	1	3	2	3	1	3	1	6	2	2	2	2	2	2	3	1	2	2	2	2	3	2	2	3	3	1	3	2	3
1.132E-03	2	1	2	2	3	3	2	1	2	2	6	2	2	1	1	2	3	1	2	2	2	2	2	2	3	1	4	2	3	3	3	1
1.133E-03	2	2	2	1	3	4	3	2	2	1	6	3	2	2	2	3	5	2	1	1	2	2	1	4	2	2	2	3	2	2	4	3
1.183E-03	3	3	2	1	2	1	2	3	3	1	2	2	2	2	2	2	3	2	2	1	1	2	1	2	3	3	4	3	2	4	4	3
1.202E-03	1	2	2	2	4	4	1	2	2	1	2	2	2	1	2	2	1	1	2	2	2	1	1	2	5	5	4	1	3	2	3	2

296

```
1.213E-03  3  2  2  2  2  3  2  3  4  1  2  2  2  1  1  3  5  2  2  1  1  1  2  3  3  3  5  4  3  3  4  2
1.290E-03  3  2  3  1  3  2  2  2  2  1  3  2  2  2  2  3  3  2  2  2  1  2  2  3  4  2  1  4  3  3  3  3
1.297E-03  3  2  3  1  3  3  2  2  2  1  7  3  2  1  2  3  4  3  1  1  1  2  2  2  2  3  5  3  2  3  2  3
1.302E-03  2  1  3  1  3  1  3  3  3  1  3  2  2  2  1  2  4  1  2  2  1  1  1  1  3  2  5  4  2  1  2  3
1.439E-03  1  3  2  1  2  2  2  3  2  1  8  2  2  1  1  2  2  1  2  2  1  2  3  2  3  2  3  3  2  3  1  2
1.449E-03  2  3  2  1  2  1  2  3  1  1  5  3  2  2  1  2  1  1  2  2  1  2  2  1  2  5  2  4  1  2  2  2
1.551E-03  4  2  2  1  3  2  3  2  3  1  3  2  2  1  1  3  2  1  2  2  2  1  2  3  4  1  4  2  3  1  4  3
1.554E-03  3  2  3  1  2  3  1  2  2  2  2  2  2  2  1  2  2  2  1  2  1  1  3  2  2  1  3  2  3  3  2  2
1.567E-03  1  2  2  2  4  3  2  3  3  1  8  2  2  1  1  2  3  3  2  2  1  2  3  3  4  1  4  2  2  2  4  2
1.579E-03  1  3  3  2  3  2  3  3  4  1  7  3  2  2  2  2  2  2  1  1  2  2  3  2  3  2  4  2  2  2  2  2
1.629E-03  3  2  2  1  3  1  2  2  2  1  9  2  2  2  1  3  1  3  2  1  2  2  2  3  2  3  3  4  2  3  4  3
1.713E-03  2  1  4  1  4  2  3  2  2  1  4  3  2  2  2  2  3  1  2  1  1  2  2  4  3  2  4  4  2  3  4  3
1.802E-03  1  2  3  1  3  2  3  2  2  1  6  2  2  1  1  2  1  2  1  1  2  2  4  3  2  1  4  4  3  4  1  2
1.843E-03  3  3  2  2  2  2  3  2  2  1  8  2  2  1  2  2  2  2  2  2  2  2  3  2  2  2  5  3  3  3  4  3
1.846E-03  2  2  1  1  3  2  2  4  1  1  6  2  2  2  2  3  3  1  1  1  2  2  2  3  2  2  2  3  4  3  3  3
1.948E-03  2  2  3  2  3  1  2  2  3  1  8  2  2  1  1  2  4  1  1  1  2  1  2  1  2  2  4  4  3  1  3  3
1.951E-03  2  3  3  1  3  3  2  1  1  1  7  2  2  1  1  2  2  2  2  2  2  2  2  2  1  1  3  3  3  2  3  3
2.049E-03  3  2  3  1  3  3  4  4  3  1  7  2  2  2  1  3  2  1  1  1  1  2  4  3  2  3  2  3  3  3  4  2
2.139E-03  3  2  3  2  3  2  2  3  3  1  3  2  2  1  2  2  1  3  1  1  2  2  1  3  3  3  4  4  4  3  4  2
2.140E-03  2  3  3  1  4  2  2  3  3  1  6  2  2  2  1  2  4  2  1  1  1  2  3  3  3  4  3  2  1  2  4  3
2.166E-03  4  2  1  2  3  4  4  2  2  1  6  2  2  2  2  2  4  1  1  2  2  1  3  3  2  2  3  2  3  2  3  3
2.392E-03  3  1  4  1  3  3  2  4  3  1  8  3  2  1  1  3  5  1  1  2  2  1  2  1  2  3  3  4  3  2  1  1
2.395E-03  2  2  2  2  3  1  1  3  1  1  2  2  2  1  1  3  3  1  1  2  2  2  1  2  3  2  2  3  2  4  4  2
2.639E-03  3  2  3  1  4  1  3  3  2  1  6  2  2  1  1  2  4  2  1  1  2  2  3  3  5  4  2  3  2  3  3  3
2.820E-03  2  3  3  2  3  3  2  3  2  1  1  2  2  1  1  3  2  2  2  2  2  2  3  2  4  4  4  2  2  3  1  3
2.844E-03  2  3  4  2  3  2  2  2  3  1  5  2  1  2  2  2  2  1  1  1  1  2  3  1  2  2  3  3  2  2  2  3
2.844E-03  2  3  3  2  2  3  2  2  4  2  5  2  2  1  1  3  2  2  1  1  2  2  2  1  1  2  3  4  2  2  3  3
2.862E-03  2  3  4  2  3  3  3  2  3  2  3  2  2  2  2  2  1  1  1  2  2  2  2  3  5  1  4  3  1  3  3  2
2.896E-03  2  3  2  1  2  2  3  2  4  1  7  2  2  1  2  3  3  1  1  2  1  2  1  2  3  1  1  3  2  2  2  3
2.916E-03  3  2  3  1  3  2  2  3  1  1  5  2  2  2  2  3  1  2  1  1  2  1  1  2  2  3  5  1  2  1  1  4
2.941E-03  2  3  2  1  2  2  1  3  1  1  4  2  2  1  2  2  3  2  1  2  2  2  1  2  1  2  2  2  2  2  4  3
2.981E-03  3  3  4  2  2  1  2  3  3  1  4  2  2  2  2  3  5  2  1  2  2  2  2  3  2  2  4  3  2  2  4  4
3.044E-03  4  3  3  1  2  3  2  3  2  1  3  2  2  1  1  2  4  1  1  1  2  2  3  4  2  1  4  2  3  2  2  2
3.067E-03  3  3  3  2  2  3  3  3  2  1  6  2  1  2  1  2  4  3  2  1  1  1  2  3  3  4  3  4  2  1  4  2
3.103E-03  3  3  2  2  2  2  3  3  3  2  6  2  1  2  2  3  2  1  1  1  1  2  2  3  1  3  3  2  2  3  3  3
3.165E-03  2  3  4  2  2  3  1  2  3  1  6  3  2  2  2  2  2  1  1  2  1  2  2  4  2  2  3  2  4  2  4  2
3.174E-03  2  3  1  1  3  2  3  3  3  1  7  3  2  2  1  3  2  1  2  2  2  1  2  2  2  2  4  3  2  3  3  2
3.389E-03  4  2  2  2  3  2  4  2  3  1  3  2  2  2  1  2  1  2  1  2  2  2  2  3  4  2  2  4  2  4  3  4
3.949E-03  3  4  2  2  4  3  2  3  2  1  5  2  2  2  2  2  4  2  2  1  2  2  3  3  2  2  3  2  3  2  4  2
4.350E-03  2  3  2  1  3  2  3  3  1  2  5  2  1  2  2  2  2  2  1  2  2  2  2  1  4  3  3  3  3  2  4  2
4.560E-03  3  3  3  2  2  2  2  2  1  1  9  3  2  2  2  3  3  1  1  2  2  1  3  2  2  3  4  3  3  3  4  3
4.663E-03  2  3  2  1  2  2  4  2  4  1  5  3  2  1  2  2  5  2  1  1  1  2  1  2  2  2  3  2  3  3  3  2
4.675E-03  3  3  4  1  3  2  1  4  3  2  7  2  1  1  1  1  2  1  1  2  2  1  3  4  3  4  3  3  1  3  4  3
4.682E-03  2  3  3  1  3  2  3  2  3  1  7  2  1  1  2  3  2  1  1  1  1  2  2  3  3  2  4  3  2  2  4  4
4.691E-03  2  3  3  1  3  2  4  3  2  1  2  3  2  1  2  1  3  2  2  2  2  2  3  3  2  4  5  3  3  3  4  3
4.711E-03  4  3  3  2  3  3  2  4  3  2  3  3  2  1  2  3  2  2  1  1  1  1  3  2  4  4  2  3  2  3  3  3
4.713E-03  1  3  1  1  2  3  2  2  3  1  5  1  2  2  2  2  2  1  1  1  1  1  1  2  2  2  4  4  3  1  3  2
4.857E-03  2  3  2  1  2  3  3  3  2  1  9  1  2  1  2  2  4  3  1  1  1  2  1  3  3  2  4  3  4  3  4  3
5.108E-03  2  2  2  1  4  2  3  2  1  1  9  2  2  1  2  3  1  1  1  1  1  1  2  4  4  2  3  2  3  3  4  2
5.557E-03  3  3  2  2  2  2  2  3  2  1  3  3  2  2  2  2  3  1  1  1  1  1  2  4  3  2  2  3  2  4  2  3
5.749E-03  2  3  2  1  2  3  2  1  3  1  5  2  1  1  1  3  5  2  1  2  1  2  1  2  2  5  2  3  3  2  2  3
5.804E-03  3  4  4  1  3  2  2  4  2  2  8  2  2  2  2  2  4  2  2  2  2  1  1  3  3  2  3  3  4  2  3  3
6.690E-03  2  3  2  1  3  2  3  2  3  1  7  2  2  2  1  2  1  3  1  2  1  2  3  3  2  4  4  2  3  4  2  2
6.692E-03  4  2  3  1  4  2  3  4  3  2  6  2  1  1  2  2  3  2  1  1  2  2  2  1  2  2  4  2  4  2  1  3
6.765E-03  3  3  3  2  3  1  3  1  2  1  3  3  2  2  1  3  3  2  1  2  2  1  3  1  4  3  5  2  3  3  3  2
6.800E-03  2  4  3  1  4  2  2  2  3  2  7  3  2  2  1  2  1  2  2  1  2  2  3  2  1  3  2  2  4  1  2  3
6.853E-03  3  3  3  1  3  3  2  2  2  1  6  2  2  2  1  1  5  1  1  2  1  2  2  1  2  4  4  3  3  3  2  4
7.126E-03  3  3  2  1  4  1  2  2  2  1  9  2  2  1  2  2  4  1  1  2  1  2  2  2  2  2  3  3  1  3  4  2
8.235E-03  3  3  2  1  3  2  2  2  2  1  7  3  2  1  1  3  1  3  1  2  1  2  3  1  3  4  4  4  2  3  3  1
8.297E-03  2  3  2  2  3  3  3  2  2  1  7  3  2  1  1  4  3  2  1  2  1  2  2  2  3  3  3  3  2  3  2  4
8.600E-03  3  3  2  2  3  4  4  3  3  1  5  3  2  1  1  1  5  2  1  2  1  2  1  3  2  2  3  2  2  4  4  2
1.105E-02  2  4  2  1  3  3  2  3  3  1  6  3  2  1  1  2  4  1  2  2  1  2  2  1  5  2  3  2  3  2  3  3
1.248E-02  2  4  3  2  2  3  2  3  2  1  3  3  2  1  2  2  5  1  2  2  2  2  2  2  2  2  3  3  2  3  3  2
1.371E-02  2  3  4  1  4  4  3  3  3  1  3  3  2  2  2  3  1  1  1  1  2  2  1  2  4  4  3  2  3  2  4  3
2.234E-02  3  4  4  1  2  3  3  2  2  1  3  2  2  2  2  3  1  2  1  2  2  2  2  2  2  4  4  3  1  2  3  3
2.343E-02  3  4  3  1  2  2  2  2  3  1  6  3  2  2  2  3  5  1  1  2  1  2  2  2  4  2  5  3  2  2  3  4
2.386E-02  1  4  3  2  1  3  2  3  3  1  9  2  2  1  1  2  2  1  1  2  2  2  2  1  4  3  4  2  2  3  4  3
3.323E-02  2  4  3  1  3  4  2  3  2  1  6  2  2  2  1  3  3  1  2  2  2  2  3  3  2  2  2  3  2  4  3  3
4.658E-02  3  4  2  2  3  2  2  3  2  1  3  3  2  2  1  2  5  3  2  1  2  2  3  2  2  2  4  3  2  3  3  4
4.665E-02  4  4  3  2  1  2  4  3  2  1  5  1  2  1  1  2  1  2  1  2  1  2  1  2  3  2  2  4  4  2  3  2
5.280E-02  3  4  3  1  4  3  3  1  3  2  6  2  2  1  1  2  4  1  2  2  1  1  2  2  2  3  4  3  2  4  4  4
5.733E-02  2  4  2  1  2  3  4  4  3  1  5  3  2  1  1  3  1  2  1  1  1  1  1  2  3  4  4  2  4  3  3  3
6.663E-02  4  4  3  2  2  3  2  2  2  1  6  3  2  1  1  2  3  2  1  2  1  2  3  2  4  2  2  3  3  3  3  3
8.960E-02  2  4  3  1  3  4  1  2  3  1  6  2  2  2  1  3  2  3  1  2  1  2  1  2  2  2  5  3  3  2  3  4
    MEAN =     5.085E-03     VARIANCE =     1.562E-04

    PERCENTILES :
         5-TH =      1.802E-04  50-TH =      1.192E-03  95-TH =      2.386E-02
    LOGARITHMIC MIDPOINT (OF POINTS > 0.) =      1.593E-03
    NUMBER ABOVE MIDPOINT = 64
    NUMBER BELOW MIDPOINT = 86
    CHI-SQUARED(1) =      3.227E+00
    DO NOT REJECT NULL (p > .05)
```

```
CONSEQUENCE MEASURE:
 LATENT CANCERS


 BASE CASE :
  PEACH BOTTOM LLH (CRAC2)

 FRACTIONAL CONTRIBUTION OF EACH SEQUENCE TO MEAN RISK
                 SEQUENCE            CONTRIBUTION
                 TB                        0.1443
                 TBUX                      0.8218
                 TBU                       0.0069
                 TCSX                      0.0076
                 TCUX                      0.0021
                 TCSRX2                    0.0137
                 TCSRV23                   0.0036
```

```
CONSEQUENCE MEASURE:
 LATENT CANCERS


 BASE CASE :
  PEACH BOTTOM LLH (CRAC2)

 FRACTIONAL CONTRIBUTION OF EACH NONZERO BIN TO MEAN RISK
                   BIN                      CONTRIBUTION
         AAACAAGEFABCCABBEDABBB               0.0001
         AAACAAGEFABCCABBEEABBB               0.0001
         AAACACGEFABCCABBEDABBB               0.0001
         AAACACGEFABCCABBEEABBB               0.0001
         AAACACGGDABCBABBECABBB               0.0002
         AAACACGGDABCBABBEDABBB               0.0004
         AAACACGGDABCBABBEEABBB               0.0004
         AAACACGGDABCBADBEDABBB               0.0002
         AAACACGGDABCBADBEEABBB               0.0003
         BAACAAGBDAACBBBBHHABBB               0.0001
         BAACAAGBDAACBDDBHHABBB               0.0001
         BAACAAGBDABCBBBBHHABBB               0.0003
         BAACAAGBDABCBDDBHHABBB               0.0001
         BAACAAGBFABCCBBBHHABBB               0.0002
         BAACACGBDAACBBBBHHABBB               0.0022
         BAACACGBDAACBDDBHHABBB               0.0015
         BAACACGBDABCBBBBHHABBB               0.0003
         BAACACGBDABCBDDBHHABBB               0.0002
         BAACACGBFAACCBBBHHABBB               0.0006
         BAACACGBFAACCDDBHHABBB               0.0001
         BAACACGBFABCCBBBHHABBB               0.0004
         BAACACGGDAACBABBEDABBB               0.0002
         BAACACGGDAACBADBEDABBB               0.0001
         BABBACGCFAACCBBBHHABBB               0.0001
         BABBACGGDAACBABBEGABBB               0.0001
         BABBACGGDABCBADBEGABBB               0.0001
         BACBAAGCFABCCBBBHHABBB               0.0003
         CAACAABGDDACBABBAEABAB               0.0001
         CAACACBGDABCBABBADABAB               0.0001
         CAACACBGDABCBABBAEABAB               0.0001
         CAACACBGDDACBABBADABAB               0.0002
         CAACACBGDDACBABBAEABAB               0.0002
         CAACACBGDDACBCDBACABAB               0.0002
         CAACACBGDDACBCDBADABAB               0.0001
         CAACACBGDDACBCDBAEABAB               0.0004
         CAACACBGDDACBCDBAFABAB               0.0001
         CAACACBGFDACBCCBADABAB               0.0001
         CAACACBGFDACBCCBAEABAB               0.0001
         CAACACBGFDACBCDBADABAB               0.0002
         CAACACBGFDACBCDBAEABAB               0.0002
         CAACCCBGDDACBABBADABAB               0.0001
         CAACCCBGDDACBABBAEABAB               0.0001
         CAACCCBGDDACBCDBADABAB               0.0001
         CAACCCBGDDACBCDBAEABAB               0.0001
         CAACCCBGFDACBCCBAEABAB               0.0001
         DAAAAAGBDABCBBBBHHABBB               0.0005
         DAAAAAGBDABCBDDBHHABBB               0.0001
         DAAAAAGBDDACBBBBHHABBB               0.0002
         DAAAAAGBDDACBDDBHHABBB               0.0003
         DAAAAAGBFABCCBBBHHABBB               0.0005
         DAAAAAGBFABCCDDBHHABBB               0.0001
         DAAAAAGBFDACCBBBHHABBB               0.0007
         DAAAAAGBFDACCDDBHHABBB               0.0002
         DAAAACGBDABCBBBBHHABBB               0.0005
         DAAAACGBDABCBDDBHHABBB               0.0001
         DAAAACGBDDACBBBBHHABBB               0.0018
```

298

DAAAACGBDDACBDDBHHABBB	0.0016
DAAAACGBFABCCBBBHHABBB	0.0006
DAAAACGBFABCCDDBHHABBB	0.0001
DAAAACGBFDACCBBBHHABBB	0.0012
DAAAACGBFDACCDDBHHABBB	0.0004
DAAAACGGDDACBBBBADABAB	0.0001
DAAAACGGDDACBBBBAEABAB	0.0003
DAAAACGGDDACBDDBADABAB	0.0001
DAAAACGGDDACBDDBAEABAB	0.0003
DAAAACGGDDACBDDBAGABAB	0.0001
DAAACCGBDCACBBBBHHABBB	0.0004
DAAACCGBDDACBDDBHHABBB	0.0001
DAAACCGBFDACCBBBHHABBB	0.0001
DAAACCGBFDACCDDBHHABBB	0.0001
DABAAAGADABCBDDBHGABAB	0.0002
DABAAAGADDACBBBBHGABAB	0.0001
DABAAAGADDACBDDBHGABAB	0.0001
DABAACGADABCBBBBHGABAB	0.0009
DABAACGADABCBDDBHGABAB	0.0001
DABAACGADDACBBBBHGABAB	0.0016
DABAACGADDACBDDBHGABAB	0.0005
DACAAAGADABCCBBBHHABBB	0.0001
EBAACCFGFDBCBADBEHBBBB	0.0002
EBAACCGGDDBCBABBEGABBB	0.0004
EBAACCGGDDBCBABBEGBBBB	0.0003
EBAACCGGDDBCBABBEHABBB	0.0020
EBAACCGGDDBCBABBEHBBBB	0.0021
EBAACCGGDDBCBADBEHABBB	0.0010
EBAACCGGDDBCBADBEHBBBB	0.0009
EBACBBGEFCBCCABBFBBABA	0.0001
EBACBBGEFCBCCABBFCBABA	0.0004
EBACBBGEFCBCCABBFEABBA	0.0006
EBACBBGEFCBCCABBFFABBA	0.0001
EBACBBGGDCBCBABBFBBABA	0.0091
EBACBBGGDCBCBABBFCBABA	0.0014
EBACBBGGDCBCBABBFDABBA	0.0006
EBACBBGGDCBCBABBFEABBA	0.0008
EBACBBGGDCBCBABBFFABBA	0.0005
EBACBCGEFCBCCABBFBBABA	0.0001
EBACBCGEFCBCCABBFCBABA	0.0004
EBACBCGEFCBCCABBFEABBA	0.0001
EBACBCGEFCBCCABBFFABBA	0.0001
EBACBCGGDCBCBABBFBBABA	0.0062
EBACBCGGDCBCBABBFCBABA	0.0014
EBACBCGGDCBCBABBFDABBA	0.0008
EBACBCGGDCBCBABBFEABBA	0.0017
EBACBCGGDCBCBABBFFABBA	0.0005
EBACBCGGDCBCBABBFFBBBA	0.0009
EBACBCGGDCBCBADBFBBABA	0.0039
EBACBCGGDCBCBADBFEABBA	0.0005
EBACBCGGDCBCBADBFFABBA	0.0004
EBACCCDEEDBCCADBFBBABB	0.0002
EBACCCDGFDBCBABBFBBABB	0.0003
EBACCCDGFDBCBACBFBBABB	0.0001
EBACCCDGFDBCBADBFBBABB	0.0042
EBACCCFGFDBBBABBFBBABB	0.0004
EBACCCFGFDBBBACBFEABBB	0.0001
EBACCCFGFDBBBADBFCBABB	0.0011
EBACCCFGFDBBBADBFEABBB	0.0010
EBACCCFGFDBBBADBFFABBB	0.0001
EBACCCFGFDBCBABBFBBABB	0.0009
EBACCCFGFDBCBABBFCBABB	0.0061
EBACCCFGFDBCBABBFEABBB	0.0151
EBACCCFGFDBCBABBFEBBBB	0.0004
EBACCCFGFDBCBABBFFABBB	0.0002
EBACCCFGFDBCBACBFBBABB	0.0001
EBACCCFGFDBCBACBFCBABB	0.0018
EBACCCFGFDBCBACBFEABBB	0.0005
EBACCCFGFDBCBADBFBBABB	0.0009
EBACCCFGFDBCBADBFCABBB	0.0003
EBACCCFGFDBCBADBFCBABB	0.0228
EBACCCFGFDBCBADBFDBBBB	0.0001
EBACCCFGFDBCBADBFEABBB	0.0052
EBACCCFGFDBCBADBFEBBBB	0.0018
EBACCCFGFDBCBADBFFABBB	0.0006
EBACCCFGFDBCBADBFGABAB	0.0001
EBACCCGDFDBCBABBFABAAB	0.0001
EBACCCGDFDBCBABBFBBABB	0.0002
EBACCCGDFDBCCABBFBBABB	0.0001
EBACCCGEFDBBCABBFBBABB	0.0002
EBACCCGEFDBCCABBFBBABB	0.0004
EBACCCGEFDBCCABBFCABBB	0.0001
EBACCCGEFDBCCABBFCBABB	0.0002
EBACCCGEFDBCCABBFEABBB	0.0008
EBACCCGEFDBCCADBFCBABB	0.0089
EBACCCGEFDBCCADBFEABBB	0.0012

EBACCCGFFDBCBABBFEABBB	0.0002
EBACCCGFFDBCCABBFEABBB	0.0001
EBACCCGGDDBBBABBFABABB	0.0012
EBACCCGGDDBBBABBFBBABB	0.0001
EBACCCGGDDBBBABBFEABBB	0.0016
EBACCCGGDDBBBABBFFABBB	0.0012
EBACCCGGDDBBBABBFGABBB	0.0002
EBACCCGGDDBBBADBFABABB	0.0016
EBACCCGGDDBBBADBFCBABB	0.0012
EBACCCGGDDBBBADBFEABBB	0.0003
EBACCCGGDDBBBADBFFBBBB	0.0002
EBACCCGGDDBCBABBFABABB	0.0905
EBACCCGGDDBCBABBFBABAB	0.0002
EBACCCGGDDBCBABBFBBABB	0.2630
EBACCCGGDDBCBABBFCBABB	0.0321
EBACCCGGDDBCBABBFCBBBB	0.0029
EBACCCGGDDBCBABBFDABBB	0.0128
EBACCCGGDDBCBABBFDBBBB	0.0014
EBACCCGGDDBCBABBFEABBB	0.0452
EBACCCGGDDBCBABBFEBBBB	0.0230
EBACCCGGDDBCBABBFFABBB	0.0405
EBACCCGGDDBCBABBFFBBBB	0.0082
EBACCCGGDDBCBABBFGABBB	0.0126
EBACCCGGDDBCBADBFABABB	0.0360
EBACCCGGDDBCBADBFBBABB	0.0543
EBACCCGGDDBCBADBFCBABB	0.0044
EBACCCGGDDBCBADBFEABBB	0.0148
EBACCCGGDDBCBADBFEBBBB	0.0006
EBACCCGGDDBCBADBFFABBB	0.0049
EBACCCGGDDBCBADBFFBBBB	0.0068
EBACCCGGDDBCBADBFGABBB	0.0001
EBACCCGGEDBBBABBFBBABB	0.0012
EBACCCGGEDBBBABBFEABBB	0.0001
EBACCCGGEDBBBABBFFBBBB	0.0002
EBACCCGGEDBBBADBFEABBB	0.0016
EBACCCGGEDBCBABBFBBABB	0.0025
EBACCCGGEDBCBABBFCBABB	0.0122
EBACCCGGEDBCBABBFCBBBB	0.0021
EBACCCGGEDBCBABBFEABBB	0.0109
EBACCCGGEDBCBABBFEBBBB	0.0011
EBACCCGGEDBCBABBFFABBB	0.0003
EBACCCGGEDBCBABBFFBBBB	0.0003
EBACCCGGEDBCBABBFGABBB	0.0002
EBACCCGGEDBCBABBFGBBBB	0.0001
EBACCCGGEDBCBADBFCBABB	0.0112
EBACCCGGEDBCBADBFEABBB	0.0026
EBACCCGGEDBCBADBFEBBBB	0.0009
EBACCCGGEDBCBADBFFBBBB	0.0001
EBBBACGEFBBCCABBDGABBB	0.0005
EBBBACGEFBBCCABBEGABBB	0.0006
EBBBACGGDBBBBABBDGABBB	0.0001
EBBBACGGDBBBBABBEGABBB	0.0001
EBBBACGGDBBCBABBDGABBB	0.0008
EBBBACGGDBBCBABBEGABBB	0.0009
EBBBACGGDBBCBADBDGABBB	0.0008
EBBBACGGDBBCBADBEGABBB	0.0008
FCACBBGGDCBCBABBDBBABA	0.0001
FCACBBGGDCBCBABBDCBABA	0.0001
FCACBBGGDCBCBABBDEABBA	0.0001
FCACBBGGDCBCBABBEBBABA	0.0002
FCACBBGGDCBCBABBEEABBA	0.0002
FCACBCGGDCBCBABBDBBABA	0.0001
FCACBCGGDCBCBABBDCBABA	0.0001
FCACBCGGDCBCBABBDEABBA	0.0001
FCACBCGGDCBCBABBEBBABA	0.0001
FCACBCGGDCBCBABBEEABBA	0.0002
FCACBCGGDCBCBADBDCBABA	0.0001
FCACBCGGDCBCBADBDFABBA	0.0001
FCACBCGGDCBCBADBECBABA	0.0001
FCACBCGGDCBCBADBEEABBA	0.0001
FCACCCDEEDBCCADBEBBABB	0.0001
FCACCCDGFDBCBACBEBBABB	0.0002
FCACCCDGFDBCBADBDBBABB	0.0010
FCACCCDGFDBCBADBDCBABB	0.0004
FCACCCDGFDBCBADBDDBBBB	0.0001
FCACCCDGFDBCBADBDEABBB	0.0004
FCACCCDGFDBCBADBEBBABB	0.0025
FCACCCDGFDBCBADBECBABB	0.0003
FCACCCFGFDBCBABBDEABBB	0.0002
FCACCCFGFDBCBABBDFABBB	0.0001
FCACCCFGFDBCBABBECBABB	0.0001
FCACCCFGFDBCBABBEEABBB	0.0005
FCACCCFGFDBCBABBGEABBB	0.0008
FCACCCFGFDBCBADBCFABBB	0.0001
FCACCCFGFDBCBADBDEBBBB	0.0001
FCACCCFGFDBCBADBDFABBB	0.0001

300

FCACCCFGFDBCBADBEBBABB	0.0002
FCACCCFGFDBCBADBECBABB	0.0002
FCACCCFGFDBCBADBEEABBB	0.0009
FCACCCFGFDBCBADBEEBBBB	0.0001
FCACCCFGFDBCBADBEFABBB	0.0002
FCACCCFGFDBCBADBEGABBB	0.0002
FCACCCFGFDBCBADBGBBABB	0.0001
FCACCCGBDDBCBABBHHABBB	0.0003
FCACCCGBDDBCBABBHHBABB	0.0001
FCACCCGBDDBCCDDBHHABBB	0.0006
FCACCCGBDDBCBDDBHHBABB	0.0005
FCACCCGBFDBCCDDBHHABBB	0.0002
FCACCCGBFDBCCDDBHHBABB	0.0001
FCACCCGDFDBCBABBEBBABB	0.0001
FCACCCGDFDBCBADBDCBABB	0.0004
FCACCCGEFDBCCABBEEABBB	0.0001
FCACCCGEFDBCCADBEGABBB	0.0004
FCACCCGGDDBBBABBECBABB	0.0002
FCACCCGGDDBBBABBEEABBB	0.0033
FCACCCGGDDBBBADBGCBABB	0.0004
FCACCCGGDDBCBABBCABABB	0.0001
FCACCCGGDDBCBABBCBBABB	0.0026
FCACCCGGDDBCBABBDABABB	0.0018
FCACCCGGDDBCBABBDBBABB	0.0090
FCACCCGGDDBCBABBDCABBB	0.0001
FCACCCGGDDBCBABBDCBABB	0.0053
FCACCCGGDDBCBABBDDABBB	0.0025
FCACCCGGDDBCBABBDEABBB	0.0038
FCACCCGGDDBCBABBDEBBBB	0.0003
FCACCCGGDDBCBABBDFABBB	0.0023
FCACCCGGDDBCBABBDFBBBB	0.0002
FCACCCGGDDBCBABBDGABBB	0.0076
FCACCCGGDDBCBABBEABABB	0.0033
FCACCCGGDDBCBABBEBBABB	0.0115
FCACCCGGDDBCBABBECBABB	0.0026
FCACCCGGDDBCBABBEDABBB	0.0011
FCACCCGGDDBCBABBEEABBB	0.0146
FCACCCGGDDBCBABBEEBBBB	0.0005
FCACCCGGDDBCBABBEFABBB	0.0021
FCACCCGGDDBCBABBEFBBBB	0.0004
FCACCCGGDDBCBABBEGABBB	0.0011
FCACCCGGDDBCBABBGABABB	0.0002
FCACCCGGDDBCBABBGBBABB	0.0023
FCACCCGGDDBCBABBGCBABB	0.0019
FCACCCGGDDBCBABBGEABBB	0.0002
FCACCCGGDDBCBACBEABABB	0.0001
FCACCCGGDDBCBADBDABABB	0.0012
FCACCCGGDDBCBADBDBBABB	0.0018
FCACCCGGDDBCBADBDCBABB	0.0025
FCACCCGGDDBCBADBDEABBB	0.0017
FCACCCGGDDBCBADBDEBBBB	0.0002
FCACCCGGDDBCBADBDFABBB	0.0022
FCACCCGGDDBCBADBDGABBB	0.0033
FCACCCGGDDBCBADBEABABB	0.0022
FCACCCGGDDBCBADBEBBABB	0.0010
FCACCCGGDDBCBADBECBABB	0.0074
FCACCCGGDDBCBADBEEABBB	0.0025
FCACCCGGDDBCBADBEEBBBB	0.0002
FCACCCGGDDBCBADBEFABBB	0.0005
FCACCCGGDDBCBADBGCBABB	0.0007
FCACCCGGDDBCBADBGEABBB	0.0010
FCACCCGGDDBCBDDBHABABB	0.0001
FCACCCGGFDBBBABBDEABBB	0.0001
FCACCCGGEDBCBABBDEABBB	0.0004
FCACCCGGEDBCBABBEBBABB	0.0003
FCACCCGGEDBCBABBECBABB	0.0001
FCACCCGGEDBCBABBEEABBB	0.0021
FCACCCGGEDBCBABBGEABBB	0.0008
FCACCCGGEDBCBABBGFABBB	0.0001
FCACCCGGEDBCBADBCFABBB	0.0002
FCACCCGGEDBCBADBDCBABB	0.0002
FCACCCGGEDBCBADBEGABBB	0.0001
FCBBAAGCDBBBBBBBHHABBB	0.0003
FCBBAAGCDBBBBDDBHHABBB	0.0001
FCBBAAGCDBBCBBBBHHABBB	0.0005
FCBBAAGCDBBCBDDBHHABBB	0.0001
FCBBAAGCFBBBCBBBHHABBB	0.0002
FCBBAAGCFBBBCDDBHHABBB	0.0001
FCBBAAGCFBBCCBBBHHABBB	0.0004
FCBBAAGCFBBCCDDBHHABBB	0.0002
FCBBACGCDBBBBBBBHHABBB	0.0004
FCBBACGCDBBBBDDBHHABBB	0.0002
FCBBACGCDBBCBBBBHHABBB	0.0008
FCBBACGCDBBCBBBBHHBBBB	0.0002
FCBBACGCDBBCBDDBHHABBB	0.0003
FCBBACGCFBBBCBBBHHABBB	0.0002

FCBBACGCFBBBCDDBHHABBB	0.0001
FCBBACGCFBBCCBBBHHABBB	0.0005
FCBBACGCFBBCCBBBHHBBBB	0.0001
FCBBACGCFBBCCDDBHHABBB	0.0004
FCBBACGCFBBCCDDBHHBBBB	0.0001
FCBBACGEFBBCCABBEGABBB	0.0003
FCBBACGEFBBCCADDEGABBB	0.0001
FCBBACGGDBBBBABBEGABBB	0.0001
FCBBACGGDBBCBABBEGABBB	0.0005
FCBBACGGDBBCBABBEGBBBB	0.0001
FCBBACGGDBBCBADBEGABBB	0.0003
FCBBACGGDBBCBADBEGBBBB	0.0001
FCCBAAGCFBBACBBBHHABBB	0.0001
FCCBAAGCFBBACDDBHHABBB	0.0001
FCCBAAGCFBBBCBBBHHABBB	0.0011
FCCBAAGCFBBBCDDBHHABBB	0.0004
FCCBAAGCFBBCCBBBHHABBB	0.0033
FCCBAAGCFBBCCDDBHHABBB	0.0013

```
CONSEQUENCE MEASURE:
  LATENT CANCERS


 BASE CASE :
  PEACH BOTTOM LLH (CRAC2)

 FRACTIONAL CONTRIBUTIONS OF EACH RELEASE TO MEAN RISK
                   RELEASE                 CONTRIBUTION
                   PCH  1D                    0.0000
                   PCH  2D                    0.0005
                   PCH  3D                    0.0192
                   PCH  4D                    0.0143
                   PCH  5D                    0.0611
                   PCH  6D                    0.1358
                   PCH  7D                    0.1998
                   PCH  8D                    0.4025
                   PCH  9D                    0.1402
                   PCH 10D                    0.0000
                   PCH 11D                    0.0000
                   PCH 12D                    0.0000
                   PCH 13D                    0.0000
                   PCH 14D                    0.0000
                   PCH 15D                    0.0003
                   PCH 16D                    0.0000
                   PCH 17D                    0.0000
                   PCH 18D                    0.0000
                   PCH 19D                    0.0001
                   PCH 20D                    0.0003
                   PCH 21D                    0.0009
                   PCH 22D                    0.0016
                   PCH 23D                    0.0009
                   PCH 24D                    0.0026
                   PCH 25D                    0.0000
                   PCH 26D                    0.0006
                   PCH 27D                    0.0008
                   PCH 28D                    0.0030
                   PCH 29D                    0.0006
                   PCH 30D                    0.0012
                   PCH 31D                    0.0011
                   PCH 32D                    0.0003
                   PCH 33D                    0.0007
                   PCH 34D                    0.0023
                   PCH 35D                    0.0000
                   PCH 36D                    0.0021
                   PCH 37D                    0.0006
                   PCH 38D                    0.0005
                   PCH 39D                    0.0006
                   PCH 40D                    0.0000
                   PCH 41D                    0.0022
                   PCH 42D                    0.0004
                   PCH 43D                    0.0002
                   PCH 44D                    0.0001
                   PCH 45D                    0.0003
                   PCH 46D                    0.0005
                   PCH 47D                    0.0007
                   PCH 48D                    0.0002
                   PCH 49D                    0.0000
                   PCH 50D                    0.0003
                   PCH 51D                    0.0001
                   PCH 52D                    0.0000
                   PCH 53D                    0.0000
                   PCH 54D                    0.0000
```

```
CONSEQUENCE MEASURE:
  LATENT CANCERS

  SENSITIVITY OF RISK TO ISSUES
  DISTRIBUTION OF RISK AT EACH LEVEL OF EACH ISSUE
  BASE CASE :
   PEACH BOTTOM LLB (CRAC2)

GP ISS LVL NUM      5%          50%          MEAN         95%          R**2     F   DF        SIGNIF.
 1   1   1  15  0.4763E-03  0.7041E-03  0.2718E-02  0.1591E-01    0.01     0.7(  3,146)    0.53NS
         3  60  0.1632E-03  0.8894E-03  0.4244E-02  0.2288E-01
         2  60  0.9144E-04  0.1576E-02  0.5462E-02  0.2134E-01
         4  15  0.3200E-03  0.1551E-02  0.9313E-02  0.6095E-01
 1   2   1  15  0.1004E-03  0.7002E-03  0.8508E-03  0.2200E-02    0.37    29.1(  3,146)    0.00**
         2  60  0.9794E-04  0.7451E-03  0.1118E-02  0.3144E-02
         3  60  0.2824E-03  0.2832E-02  0.2994E-02  0.8266E-02
         4  15  0.4348E-02  0.2386E-01  0.3356E-01  0.8321E-01
 1   3   1  15  0.2456E-03  0.8266E-03  0.1253E-02  0.4269E-02    0.04     1.8(  3,146)    0.14NS
         2  60  0.9794E-04  0.1132E-02  0.3885E-02  0.1009E-01
         4  15  0.6344E-03  0.2844E-02  0.4431E-02  0.1977E-01
         3  60  0.1632E-03  0.1465E-02  0.7407E-02  0.4963E-01
 1   4   2  62  0.1318E-03  0.1053E-02  0.4820E-02  0.3118E-01    0.00     0.3(  1,148)    0.56NS
         1  88  0.2097E-03  0.1293E-02  0.5272E-02  0.2427E-01
 1   5   2  60  0.2245E-03  0.8201E-03  0.4423E-02  0.2288E-01    0.14     8.0(  3,146)    0.00**
         1  15  0.3487E-04  0.2875E-03  0.4955E-02  0.3945E-01
         3  60  0.2642E-03  0.1824E-02  0.5271E-02  0.1984E-01
         4  15  0.2243E-03  0.2639E-02  0.7123E-02  0.3769E-01
 2   1   1  15  0.2276E-03  0.1449E-02  0.2106E-02  0.7034E-02    0.00     0.0(  3,146)    0.99NS
         2  60  0.1298E-03  0.1565E-02  0.4009E-02  0.1389E-01
         3  60  0.2580E-03  0.9221E-03  0.5617E-02  0.3549E-01
         4  15  0.1095E-03  0.1037E-02  0.1024E-01  0.6993E-01
 2   2   3  60  0.1113E-03  0.8435E-03  0.3063E-02  0.1066E-01    0.04     2.3(  3,146)    0.08NS
         2  60  0.2135E-03  0.1734E-02  0.5594E-02  0.2816E-01
         1  15  0.1004E-03  0.1037E-02  0.7303E-02  0.4282E-01
         4  15  0.1903E-03  0.2049E-02  0.8923E-02  0.5445E-01
 2   3   3  60  0.9144E-04  0.1294E-02  0.4607E-02  0.2816E-01    0.00     0.2(  3,146)    0.89NS
         1  15  0.2573E-03  0.9112E-03  0.5020E-02  0.3159E-01
         2  60  0.2135E-03  0.1293E-02  0.5370E-02  0.2288E-01
         4  15  0.2777E-03  0.1846E-02  0.5927E-02  0.3351E-01
 2   4   4  15  0.5269E-04  0.7085E-03  0.1269E-02  0.4143E-02    0.02     0.8(  3,146)    0.49NS
         1  15  0.1597E-03  0.1846E-02  0.1996E-02  0.4973E-02
         2  60  0.2663E-03  0.1167E-02  0.5596E-02  0.3935E-01
         3  60  0.1363E-03  0.1464E-02  0.6301E-02  0.3549E-01
 2   5   2  24  0.2862E-03  0.9740E-03  0.4354E-02  0.1258E-01    0.00     0.1(  1,148)    0.78NS
         1 126  0.1360E-03  0.1207E-02  0.5225E-02  0.2549E-01
 2   6   4   9  0.2133E-03  0.9642E-03  0.1312E-02  0.2981E-02    0.04     0.7(  8,141)    0.69NS
         2  11  0.5491E-03  0.1183E-02  0.1399E-02  0.4536E-02
         8  16  0.1131E-03  0.8676E-03  0.1514E-02  0.5502E-02
         1   2*************************  0.1528E-02************
         7  20  0.1511E-03  0.1755E-02  0.2774E-02  0.8266E-02
         9  12  0.1869E-03  0.1183E-02  0.4046E-02  0.2114E-01
         3  20  0.1964E-03  0.2474E-02  0.6547E-02  0.3226E-01
         5  22  0.1796E-03  0.1149E-02  0.6803E-02  0.5066E-01
         6  38  0.1048E-03  0.1003E-02  0.8518E-02  0.6071E-01
 2   7   2  94  0.2217E-03  0.1207E-02  0.4061E-02  0.1778E-01    0.01     1.0(  2,147)    0.38NS
         3  51  0.9498E-04  0.1037E-02  0.6337E-02  0.4501E-01
         1   5  0.6722E-03  0.4713E-02  0.1157E-01  0.4665E-01
 2   8   1  15  0.9302E-04  0.2844E-02  0.2579E-02  0.6442E-02    0.00     0.1(  1,148)    0.80NS
         2 135  0.1956E-03  0.1183E-02  0.5364E-02  0.3059E-01
 2   9   2  75  0.9919E-04  0.1133E-02  0.4711E-02  0.2316E-01    0.00     0.2(  1,148)    0.68NS
         1  75  0.2415E-03  0.1213E-02  0.5460E-02  0.3945E-01
 2  10   2  75  0.1513E-03  0.1077E-02  0.2722E-02  0.1085E-01    0.01     1.1(  1,148)    0.29NS
         1  75  0.1881E-03  0.1439E-02  0.7449E-02  0.5119E-01
 2  11   1  16  0.4045E-04  0.3643E-03  0.1848E-02  0.8033E-02    0.04     2.2(  3,146)    0.09NS
         4   4*************************  0.2464E-02************
         2  80  0.2339E-03  0.1288E-02  0.4952E-02  0.3334E-01
         3  50  0.1403E-03  0.1589E-02  0.6545E-02  0.3323E-01
 2  12   2  45  0.8992E-04  0.8793E-03  0.3979E-02  0.7069E-02    0.04     1.4(  4,145)    0.22NS
         3  38  0.2668E-03  0.9445E-03  0.4390E-02  0.1908E-01
         4  22  0.1630E-03  0.2042E-02  0.4882E-02  0.2154E-01
         1  30  0.2138E-03  0.1320E-02  0.6379E-02  0.4665E-01
         5  15  0.1073E-03  0.2981E-02  0.7877E-02  0.3923E-01
 2  13   2  75  0.1493E-03  0.8590E-03  0.4298E-02  0.1760E-01    0.02     1.9(  2,147)    0.16NS
         1  60  0.2015E-03  0.1499E-02  0.4533E-02  0.2364E-01
         3  15  0.1399E-03  0.1629E-02  0.1123E-01  0.7608E-01
 2  14   2  75  0.1071E-03  0.6959E-03  0.3090E-02  0.1232E-01    0.18    31.7(  1,148)    0.00**
         1  75  0.2836E-03  0.2844E-02  0.7081E-02  0.3945E-01
 2  15   1  60  0.1511E-03  0.1254E-02  0.3781E-02  0.9654E-02    0.00     0.0(  1,148)    0.83NS
         2  90  0.1802E-03  0.1104E-02  0.5955E-02  0.3323E-01
 2  16   2  75  0.1880E-03  0.1202E-02  0.3671E-02  0.1977E-01    0.00     0.0(  1,148)    0.83NS
         1  75  0.1513E-03  0.1183E-02  0.6499E-02  0.5119E-01
 2  17   2 120  0.1590E-03  0.9716E-03  0.4862E-02  0.2364E-01    0.02     3.0(  1,148)    0.09NS
         1  30  0.2690E-03  0.2054E-02  0.5978E-02  0.5280E-01
 3   1   4   3*************************  0.1447E-02************    0.02     0.8(  3,146)    0.47NS
         2  74  0.1490E-03  0.9278E-03  0.3518E-02  0.1969E-01
         3  39  0.2404E-03  0.1579E-02  0.5895E-02  0.4001E-01
```

```
          1  34  0.1153E-03  0.1192E-02  0.7889E-02  0.5502E-01
 3   2    4  15  0.2437E-03  0.8477E-03  0.1880E-02  0.5441E-02    0.02    0.8(  3,146)    0.52NS
          3  51  0.2567E-03  0.1077E-02  0.2457E-02  0.6642E-02
          1  29  0.2046E-03  0.8485E-03  0.3116E-02  0.1227E-01
          2  55  0.1113E-03  0.1554E-02  0.9435E-02  0.5616E-01
 3   3    1  14  0.1257E-03  0.8393E-03  0.1644E-02  0.5812E-02    0.02    0.7(  4,145)    0.60NS
          5   7  0.6518E-04  0.1202E-02  0.2827E-02  0.1185E-01
          3  36  0.2655E-03  0.1294E-02  0.4903E-02  0.2779E-01
          4  35  0.1493E-03  0.7563E-03  0.4905E-02  0.2375E-01
          2  58  0.1443E-03  0.1823E-02  0.6411E-02  0.4069E-01
 3   4    1  15  0.3809E-03  0.1551E-02  0.1480E-02  0.3006E-02    0.01    0.2(  4,145)    0.91NS
          5   5  0.1802E-03  0.1202E-02  0.1814E-02  0.5749E-02
          3  30  0.2566E-03  0.1198E-02  0.4452E-02  0.2386E-01
          2  76  0.1258E-03  0.1057E-02  0.5955E-02  0.4209E-01
          4  24  0.1497E-03  0.2377E-02  0.6059E-02  0.2964E-01
 3   5    1   4************************  0.1166E-02************    0.02    0.7(  4,145)    0.61NS
          3  46  0.1681E-03  0.1495E-02  0.2828E-02  0.1197E-01
          2  35  0.2134E-03  0.8485E-03  0.5670E-02  0.4286E-01
          4  50  0.9306E-04  0.1365E-02  0.5836E-02  0.4658E-01
          5  15  0.5124E-03  0.1297E-02  0.9186E-02  0.6408E-01
 3   6    1   4************************  0.1388E-02************    0.00    0.2(  3,146)    0.92NS
          4  23  0.2487E-03  0.1629E-02  0.3887E-02  0.1511E-01
          2  47  0.1370E-03  0.1132E-02  0.4112E-02  0.1489E-01
          3  76  0.1193E-03  0.1008E-02  0.6244E-02  0.4209E-01
 3   7    1  18  0.7830E-04  0.7826E-03  0.2587E-02  0.1415E-01    0.03    1.6(  3,146)    0.20NS
          2  62  0.1318E-03  0.1339E-02  0.4788E-02  0.2724E-01
          3  55  0.2617E-03  0.1202E-02  0.5094E-02  0.1322E-01
          4  15  0.3948E-03  0.2139E-02  0.9280E-02  0.5445E-01
 3   8    1  25  0.9708E-04  0.7341E-03  0.1255E-02  0.5165E-02    0.09    4.6(  3,146)    0.00**
          2  58  0.1031E-03  0.9445E-03  0.4984E-02  0.2299E-01
          3  52  0.4429E-03  0.1777E-02  0.6212E-02  0.4356E-01
          4  15  0.3844E-03  0.1802E-02  0.7957E-02  0.4703E-01
 3   9    1  12  0.1463E-03  0.1082E-02  0.1707E-02  0.6158E-02    0.01    0.6(  3,146)    0.61NS
          2  27  0.1861E-03  0.1297E-02  0.2383E-02  0.7052E-02
          4  54  0.9498E-04  0.1198E-02  0.3464E-02  0.1249E-01
          3  57  0.2716E-03  0.1132E-02  0.8613E-02  0.5334E-01
 3  10    1   7  0.9306E-04  0.9112E-03  0.1953E-02  0.8235E-02    0.01    0.5(  3,146)    0.67NS
          2  49  0.1350E-03  0.1439E-02  0.3175E-02  0.8761E-02
          3  73  0.1848E-03  0.1183E-02  0.4729E-02  0.2362E-01
          4  21  0.3278E-03  0.9791E-03  0.1183E-01  0.6699E-01
 3  11    1  75  0.2191E-03  0.1297E-02  0.4208E-02  0.1137E-01    0.00    0.1(  1,148)    0.80NS
          2  75  0.1071E-03  0.1183E-02  0.5963E-02  0.4281E-01
 3  12    2  50  0.1031E-03  0.1045E-02  0.2462E-02  0.8599E-02    0.02    1.2(  2,147)    0.29NS
          3  50  0.2566E-03  0.1027E-02  0.5419E-02  0.2386E-01
          1  50  0.3138E-03  0.1632E-02  0.7375E-02  0.5280E-01
 3  13    4  37  0.1470E-03  0.1290E-02  0.2592E-02  0.1043E-01    0.02    0.8(  3,146)    0.51NS
          1  38  0.1116E-03  0.1027E-02  0.3271E-02  0.1388E-01
          2  37  0.1148E-03  0.1567E-02  0.7179E-02  0.4218E-01
          3  38  0.2665E-03  0.1310E-02  0.7290E-02  0.5022E-01
 3  14    3  30  0.9306E-04  0.1019E-02  0.3085E-02  0.6853E-02    0.00    0.1(  4,145)    0.99NS
          4  30  0.2764E-03  0.1507E-02  0.3589E-02  0.1371E-01
          5  30  0.6518E-04  0.9674E-03  0.5667E-02  0.4658E-01
          2  30  0.2133E-03  0.1008E-02  0.6334E-02  0.5280E-01
          1  30  0.1403E-03  0.1477E-02  0.6753E-02  0.5733E-01
 4   1    3  19  0.2927E-03  0.1382E-02  0.2032E-02  0.5828E-02    0.06    1.3(  7,142)    0.26NS
          6  19  0.1431E-03  0.6780E-03  0.2098E-02  0.1111E-01
          4  19  0.1576E-03  0.1951E-02  0.3001E-02  0.8556E-02
          1  19  0.1288E-03  0.7041E-03  0.4256E-02  0.2107E-01
          2  18  0.7114E-04  0.1576E-02  0.5058E-02  0.2750E-01
          5  19  0.3408E-03  0.2639E-02  0.6508E-02  0.2863E-01
          8  19  0.2579E-03  0.8201E-03  0.7911E-02  0.6226E-01
          7  18  0.6062E-04  0.1327E-02  0.1008E-01  0.6901E-01
NS=NOT SIGNIFICANT, *=SIGNIFICANT (P<.05), **=SIGNIFICANT (P<.01)
```

305

```
      CONSEQUENCE MEASURE:  LATENT CANCERS
0     ISSUE GROUP =   1   ISSUE =   1   SLC FAILURE TO ACTUATE

      LEVEL 1 NO.<MED.=  8 NO. EXP.=  7     NO.>=MED.=  7 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
      LEVEL 2 NO.<MED.= 28 NO. EXP.= 30     NO.>=MED.= 32 NO. EXP.= 30   CHI-SQ.=   0.3 DF= 1 SIG.= 0.606
      LEVEL 3 NO.<MED.= 31 NO. EXP.= 30     NO.>=MED.= 29 NO. EXP.= 30   CHI-SQ.=   0.1 DF= 1 SIG.= 0.796
      LEVEL 4 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
      OVERALL CHI-SQ=   0.6 DF=  7  SIG.= 0.999
0     ISSUE GROUP =   1   ISSUE =   2   DC COMMON MODE

      LEVEL 1 NO.<MED.= 12 NO. EXP.=  7     NO.>=MED.=  3 NO. EXP.=  8   CHI-SQ.=   6.7 DF= 1 SIG.= 0.010
      LEVEL 2 NO.<MED.= 40 NO. EXP.= 30     NO.>=MED.= 20 NO. EXP.= 30   CHI-SQ.=   6.7 DF= 1 SIG.= 0.010
      LEVEL 3 NO.<MED.= 22 NO. EXP.= 30     NO.>=MED.= 38 NO. EXP.= 30   CHI-SQ.=   4.3 DF= 1 SIG.= 0.039
      LEVEL 4 NO.<MED.=  0 NO. EXP.=  7     NO.>=MED.= 15 NO. EXP.=  8   CHI-SQ.=  13.1 DF= 1 SIG.= 0.000
      OVERALL CHI-SQ=  30.8 DF=  7  SIG.= 0.000
0     ISSUE GROUP =   1   ISSUE =   3   FAILURE TO VENT

      LEVEL 1 NO.<MED.= 11 NO. EXP.=  7     NO.>=MED.=  4 NO. EXP.=  8   CHI-SQ.=   4.3 DF= 1 SIG.= 0.038
      LEVEL 2 NO.<MED.= 31 NO. EXP.= 30     NO.>=MED.= 29 NO. EXP.= 30   CHI-SQ.=   0.1 DF= 1 SIG.= 0.796
      LEVEL 3 NO.<MED.= 27 NO. EXP.= 30     NO.>=MED.= 33 NO. EXP.= 30   CHI-SQ.=   0.6 DF= 1 SIG.= 0.439
      LEVEL 4 NO.<MED.=  5 NO. EXP.=  7     NO.>=MED.= 10 NO. EXP.=  8   CHI-SQ.=   1.1 DF= 1 SIG.= 0.301
      OVERALL CHI-SQ=   6.0 DF=  7  SIG.= 0.537
0     ISSUE GROUP =   1   ISSUE =   4   SW MOD A VS. MOD B

      LEVEL 1 NO.<MED.= 42 NO. EXP.= 44     NO.>=MED.= 46 NO. EXP.= 44   CHI-SQ.=   0.2 DF= 1 SIG.= 0.670
      LEVEL 2 NO.<MED.= 32 NO. EXP.= 31     NO.>=MED.= 30 NO. EXP.= 31   CHI-SQ.=   0.1 DF= 1 SIG.= 0.799
      OVERALL CHI-SQ=   0.2 DF=  3  SIG.= 0.970
0     ISSUE GROUP =   1   ISSUE =   5   POWER RECOVERY

      LEVEL 1 NO.<MED.= 13 NO. EXP.=  7     NO.>=MED.=  2 NO. EXP.=  8   CHI-SQ.=   9.6 DF= 1 SIG.= 0.002
      LEVEL 2 NO.<MED.= 35 NO. EXP.= 30     NO.>=MED.= 25 NO. EXP.= 30   CHI-SQ.=   1.7 DF= 1 SIG.= 0.197
      LEVEL 3 NO.<MED.= 23 NO. EXP.= 30     NO.>=MED.= 37 NO. EXP.= 30   CHI-SQ.=   3.3 DF= 1 SIG.= 0.071
      LEVEL 4 NO.<MED.=  3 NO. EXP.=  7     NO.>=MED.= 12 NO. EXP.=  8   CHI-SQ.=   4.3 DF= 1 SIG.= 0.038
      OVERALL CHI-SQ=  18.9 DF=  7  SIG.= 0.009
0     ISSUE GROUP =   2   ISSUE =   1   PROB. OF STUCK OPEN VAC. BRKR.

      LEVEL 1 NO.<MED.=  5 NO. EXP.=  7     NO.>=MED.= 10 NO. EXP.=  8   CHI-SQ.=   1.1 DF= 1 SIG.= 0.301
      LEVEL 2 NO.<MED.= 27 NO. EXP.= 30     NO.>=MED.= 33 NO. EXP.= 30   CHI-SQ.=   0.6 DF= 1 SIG.= 0.439
      LEVEL 3 NO.<MED.= 33 NO. EXP.= 30     NO.>=MED.= 27 NO. EXP.= 30   CHI-SQ.=   0.6 DF= 1 SIG.= 0.439
      LEVEL 4 NO.<MED.=  9 NO. EXP.=  7     NO.>=MED.=  6 NO. EXP.=  8   CHI-SQ.=   1.1 DF= 1 SIG.= 0.301
      OVERALL CHI-SQ=   3.3 DF=  7  SIG.= 0.852
0     ISSUE GROUP =   2   ISSUE =   2   HPSW-SPRAY

      LEVEL 1 NO.<MED.=  8 NO. EXP.=  7     NO.>=MED.=  7 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
```

306

```
     LEVEL 2 NO.<MED.= 22 NO. EXP.= 30     NO.>=MED.= 38 NO. EXP.= 30   CHI-SQ.=   4.3 DF= 1 SIG.= 0.039
     LEVEL 3 NO.<MED.= 37 NO. EXP.= 30     NO.>=MED.= 23 NO. EXP.= 30   CHI-SQ.=   3.3 DF= 1 SIG.= 0.071
     LEVEL 4 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   7.8 DF=  7  SIG.= 0.350

0    ISSUE GROUP =   2   ISSUE =   3   VENT-SBO-NACR

     LEVEL 1 NO.<MED.= 11 NO. EXP.=  7     NO.>=MED.=  4 NO. EXP.=  8   CHI-SQ.=   4.3 DF= 1 SIG.= 0.038
     LEVEL 2 NO.<MED.= 28 NO. EXP.= 30     NO.>=MED.= 32 NO. EXP.= 30   CHI-SQ.=   0.3 DF= 1 SIG.= 0.606
     LEVEL 3 NO.<MED.= 28 NO. EXP.= 30     NO.>=MED.= 32 NO. EXP.= 30   CHI-SQ.=   0.3 DF= 1 SIG.= 0.606
     LEVEL 4 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   4.8 DF=  7  SIG.= 0.682

0    ISSUE GROUP =   2   ISSUE =   4   VENT-SBO-ACR

     LEVEL 1 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
     LEVEL 2 NO.<MED.= 30 NO. EXP.= 30     NO.>=MED.= 30 NO. EXP.= 30   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 3 NO.<MED.= 28 NO. EXP.= 30     NO.>=MED.= 32 NO. EXP.= 30   CHI-SQ.=   0.3 DF= 1 SIG.= 0.606
     LEVEL 4 NO.<MED.= 10 NO. EXP.=  7     NO.>=MED.=  5 NO. EXP.=  8   CHI-SQ.=   2.4 DF= 1 SIG.= 0.120
     OVERALL CHI-SQ=   2.9 DF=  7  SIG.= 0.890

0    ISSUE GROUP =   2   ISSUE =   5   SP BYPASS, SMALL/LARGE

     LEVEL 1 NO.<MED.= 61 NO. EXP.= 63     NO.>=MED.= 65 NO. EXP.= 63   CHI-SQ.=   0.1 DF= 1 SIG.= 0.722
     LEVEL 2 NO.<MED.= 13 NO. EXP.= 12     NO.>=MED.= 11 NO. EXP.= 12   CHI-SQ.=   0.2 DF= 1 SIG.= 0.683
     OVERALL CHI-SQ=   0.3 DF=  3  SIG.= 0.961

0    ISSUE GROUP =   2   ISSUE =   6   CONT FAILURE PRESS. (T<500F B VB)

     LEVEL 1 NO.<MED.=  1 NO. EXP.=  1     NO.>=MED.=  1 NO. EXP.=  1   TEST CANNOT BE RUN; EXP. NO. < 3
     LEVEL 2 NO.<MED.=  5 NO. EXP.=  5     NO.>=MED.=  6 NO. EXP.=  6   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 3 NO.<MED.=  6 NO. EXP.= 10     NO.>=MED.= 14 NO. EXP.= 10   CHI-SQ.=   3.2 DF= 1 SIG.= 0.074
     LEVEL 4 NO.<MED.=  6 NO. EXP.=  4     NO.>=MED.=  3 NO. EXP.=  5   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 5 NO.<MED.= 11 NO. EXP.= 11     NO.>=MED.= 11 NO. EXP.= 11   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 6 NO.<MED.= 22 NO. EXP.= 19     NO.>=MED.= 16 NO. EXP.= 19   CHI-SQ.=   0.9 DF= 1 SIG.= 0.330
     LEVEL 7 NO.<MED.=  8 NO. EXP.= 10     NO.>=MED.= 12 NO. EXP.= 10   CHI-SQ.=   0.8 DF= 1 SIG.= 0.371
     LEVEL 8 NO.<MED.=  9 NO. EXP.=  8     NO.>=MED.=  7 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.617
     LEVEL 9 NO.<MED.=  6 NO. EXP.=  6     NO.>=MED.=  6 NO. EXP.=  6   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   5.2 DF= 15  SIG.= 0.990

0    ISSUE GROUP =   2   ISSUE =   7   LATE FAILURE LOCATION (800-1200 A VB)

     LEVEL 1 NO.<MED.=  2 NO. EXP.=  2     NO.>=MED.=  3 NO. EXP.=  3   TEST CANNOT BE RUN; EXP. NO. < 3
     LEVEL 2 NO.<MED.= 45 NO. EXP.= 47     NO.>=MED.= 49 NO. EXP.= 47   CHI-SQ.=   0.2 DF= 1 SIG.= 0.680
     LEVEL 3 NO.<MED.= 27 NO. EXP.= 25     NO.>=MED.= 24 NO. EXP.= 26   CHI-SQ.=   0.3 DF= 1 SIG.= 0.575
     OVERALL CHI-SQ=   0.5 DF=  3  SIG.= 0.922

0    ISSUE GROUP =   2   ISSUE =   8   CONT FAILURE SIZE, RAPID PRESS.
```

```
        LEVEL 1 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
        LEVEL 2 NO.<MED.= 67 NO. EXP.= 67     NO.>=MED.= 68 NO. EXP.= 68   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
        OVERALL CHI-SQ=   0.0 DF=  3  SIG.= 1.000

0       ISSUE GROUP =   2   ISSUE =   9   CONT FAILURE SIZE, SLOW PRESS.

        LEVEL 1 NO.<MED.= 36 NO. EXP.= 37     NO.>=MED.= 39 NO. EXP.= 38   CHI-SQ.=   0.1 DF= 1 SIG.= 0.817
        LEVEL 2 NO.<MED.= 38 NO. EXP.= 37     NO.>=MED.= 37 NO. EXP.= 38   CHI-SQ.=   0.1 DF= 1 SIG.= 0.817
        OVERALL CHI-SQ=   0.1 DF=  3  SIG.= 0.991

0       ISSUE GROUP =   2   ISSUE =  10   VB MODE, HIGH-P FLOW MELT

        LEVEL 1 NO.<MED.= 35 NO. EXP.= 37     NO.>=MED.= 40 NO. EXP.= 38   CHI-SQ.=   0.2 DF= 1 SIG.= 0.644
        LEVEL 2 NO.<MED.= 39 NO. EXP.= 37     NO.>=MED.= 36 NO. EXP.= 38   CHI-SQ.=   0.2 DF= 1 SIG.= 0.644
        OVERALL CHI-SQ=   0.4 DF=  3  SIG.= 0.935

0       ISSUE GROUP =   2   ISSUE =  11   CONT PRESS. BEFORE VB, LONG TERM TB

        LEVEL 1 NO.<MED.= 12 NO. EXP.=  8     NO.>=MED.=  4 NO. EXP.=  8   CHI-SQ.=   4.0 DF= 1 SIG.= 0.046
        LEVEL 2 NO.<MED.= 38 NO. EXP.= 40     NO.>=MED.= 42 NO. EXP.= 40   CHI-SQ.=   0.2 DF= 1 SIG.= 0.655
        LEVEL 3 NO.<MED.= 21 NO. EXP.= 25     NO.>=MED.= 29 NO. EXP.= 25   CHI-SQ.=   1.3 DF= 1 SIG.= 0.258
        LEVEL 4 NO.<MED.=  3 NO. EXP.=  2     NO.>=MED.=  1 NO. EXP.=  2   TEST CANNOT BE RUN; EXP. NO. < 3
        OVERALL CHI-SQ=   5.5 DF=  5  SIG.= 0.360

0       ISSUE GROUP =   2   ISSUE =  12   PRESSURE RISE AT VB

        LEVEL 1 NO.<MED.= 14 NO. EXP.= 15     NO.>=MED.= 16 NO. EXP.= 15   CHI-SQ.=   0.1 DF= 1 SIG.= 0.715
        LEVEL 2 NO.<MED.= 25 NO. EXP.= 22     NO.>=MED.= 20 NO. EXP.= 23   CHI-SQ.=   0.8 DF= 1 SIG.= 0.371
        LEVEL 3 NO.<MED.= 22 NO. EXP.= 19     NO.>=MED.= 16 NO. EXP.= 19   CHI-SQ.=   0.9 DF= 1 SIG.= 0.330
        LEVEL 4 NO.<MED.=  8 NO. EXP.= 11     NO.>=MED.= 14 NO. EXP.= 11   CHI-SQ.=   1.6 DF= 1 SIG.= 0.201
        LEVEL 5 NO.<MED.=  5 NO. EXP.=  7     NO.>=MED.= 10 NO. EXP.=  8   CHI-SQ.=   1.1 DF= 1 SIG.= 0.301
        OVERALL CHI-SQ=   4.6 DF=  9  SIG.= 0.869

0       ISSUE GROUP =   2   ISSUE =  13   DELTA P DUE TO SUMP WATER INTERACT.

        LEVEL 1 NO.<MED.= 26 NO. EXP.= 30     NO.>=MED.= 34 NO. EXP.= 30   CHI-SQ.=   1.1 DF= 1 SIG.= 0.302
        LEVEL 2 NO.<MED.= 43 NO. EXP.= 37     NO.>=MED.= 32 NO. EXP.= 38   CHI-SQ.=   1.9 DF= 1 SIG.= 0.166
        LEVEL 3 NO.<MED.=  5 NO. EXP.=  7     NO.>=MED.= 10 NO. EXP.=  8   CHI-SQ.=   1.1 DF= 1 SIG.= 0.301
        OVERALL CHI-SQ=   4.1 DF=  5  SIG.= 0.541

0       ISSUE GROUP =   2   ISSUE =  14   PROB OF DRY DW MELT THROUGH

        LEVEL 1 NO.<MED.= 24 NO. EXP.= 37     NO.>=MED.= 51 NO. EXP.= 38   CHI-SQ.=   9.0 DF= 1 SIG.= 0.003
        LEVEL 2 NO.<MED.= 50 NO. EXP.= 37     NO.>=MED.= 25 NO. EXP.= 38   CHI-SQ.=   9.0 DF= 1 SIG.= 0.003
        OVERALL CHI-SQ=  18.0 DF=  3  SIG.= 0.000

0       ISSUE GROUP =   2   ISSUE =  15   PROB OF WET DW MELT THROUGH

        LEVEL 1 NO.<MED.= 28 NO. EXP.= 30     NO.>=MED.= 32 NO. EXP.= 30   CHI-SQ.=   0.3 DF= 1 SIG.= 0.606
        LEVEL 2 NO.<MED.= 46 NO. EXP.= 45     NO.>=MED.= 44 NO. EXP.= 45   CHI-SQ.=   0.0 DF= 1 SIG.= 0.833
```

```
    OVERALL CHI-SQ=   0.3 DF=  3  SIG.= 0.958

0   ISSUE GROUP =   2   ISSUE =  16   PROB OF DW M-THRU W/FI-P MELT EJECT

    LEVEL 1 NO.<MED.= 37 NO. EXP.= 37     NO.>=MED.= 38 NO. EXP.= 38   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
    LEVEL 2 NO.<MED.= 37 NO. EXP.= 37     NO.>=MED.= 38 NO. EXP.= 38   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
    OVERALL CHI-SQ=   0.0 DF=  3  SIG.= 1.000

0   ISSUE GROUP =   2   ISSUE =  17   PROB OF H2 BURNS IN RB LEADING TO BP

    LEVEL 1 NO.<MED.=  9 NO. EXP.= 15     NO.>=MED.= 21 NO. EXP.= 15   CHI-SQ.=   4.8 DF= 1 SIG.= 0.028
    LEVEL 2 NO.<MED.= 65 NO. EXP.= 60     NO.>=MED.= 55 NO. EXP.= 60   CHI-SQ.=   0.8 DF= 1 SIG.= 0.361
    OVERALL CHI-SQ=   5.6 DF=  3  SIG.= 0.131

0   ISSUE GROUP =   3   ISSUE =   1   IN-VES RELEASE FROM FUEL

    LEVEL 1 NO.<MED.= 16 NO. EXP.= 17     NO.>=MED.= 18 NO. EXP.= 17   CHI-SQ.=   0.1 DF= 1 SIG.= 0.732
    LEVEL 2 NO.<MED.= 41 NO. EXP.= 37     NO.>=MED.= 33 NO. EXP.= 37   CHI-SQ.=   0.9 DF= 1 SIG.= 0.352
    LEVEL 3 NO.<MED.= 16 NO. EXP.= 19     NO.>=MED.= 23 NO. EXP.= 20   CHI-SQ.=   0.9 DF= 1 SIG.= 0.336
    LEVEL 4 NO.<MED.=  1 NO. EXP.=  1     NO.>=MED.=  2 NO. EXP.=  2  TEST CANNOT BE RUN; EXP. NO. < 3
    OVERALL CHI-SQ=   1.9 DF=  5  SIG.= 0.862

0   ISSUE GROUP =   3   ISSUE =   2   CSI DECOMP

    LEVEL 1 NO.<MED.= 16 NO. EXP.= 14     NO.>=MED.= 13 NO. EXP.= 15   CHI-SQ.=   0.6 DF= 1 SIG.= 0.457
    LEVEL 2 NO.<MED.= 23 NO. EXP.= 27     NO.>=MED.= 32 NO. EXP.= 28   CHI-SQ.=   1.2 DF= 1 SIG.= 0.281
    LEVEL 3 NO.<MED.= 26 NO. EXP.= 25     NO.>=MED.= 25 NO. EXP.= 26   CHI-SQ.=   0.1 DF= 1 SIG.= 0.779
    LEVEL 4 NO.<MED.=  9 NO. EXP.=  7     NO.>=MED.=  6 NO. EXP.=  8   CHI-SQ.=   1.1 DF= 1 SIG.= 0.301
    OVERALL CHI-SQ=   2.9 DF=  7  SIG.= 0.897

0   ISSUE GROUP =   3   ISSUE =   3   FRAC IN-VES RETENTION LEAKED, AT VB

    LEVEL 1 NO.<MED.=  9 NO. EXP.=  7     NO.>=MED.=  5 NO. EXP.=  7   CHI-SQ.=   1.1 DF= 1 SIG.= 0.285
    LEVEL 2 NO.<MED.= 24 NO. EXP.= 29     NO.>=MED.= 34 NO. EXP.= 29   CHI-SQ.=   1.7 DF= 1 SIG.= 0.189
    LEVEL 3 NO.<MED.= 16 NO. EXP.= 18     NO.>=MED.= 20 NO. EXP.= 18   CHI-SQ.=   0.4 DF= 1 SIG.= 0.505
    LEVEL 4 NO.<MED.= 22 NO. EXP.= 17     NO.>=MED.= 13 NO. EXP.= 18   CHI-SQ.=   2.9 DF= 1 SIG.= 0.091
    LEVEL 5 NO.<MED.=  3 NO. EXP.=  3     NO.>=MED.=  4 NO. EXP.=  4   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
    OVERALL CHI-SQ=   6.2 DF=  9  SIG.= 0.723

0   ISSUE GROUP =   3   ISSUE =   4   S POOL DF

    LEVEL 1 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
    LEVEL 2 NO.<MED.= 40 NO. EXP.= 38     NO.>=MED.= 36 NO. EXP.= 38   CHI-SQ.=   0.2 DF= 1 SIG.= 0.646
    LEVEL 3 NO.<MED.= 14 NO. EXP.= 15     NO.>=MED.= 16 NO. EXP.= 15   CHI-SQ.=   0.1 DF= 1 SIG.= 0.715
    LEVEL 4 NO.<MED.= 11 NO. EXP.= 12     NO.>=MED.= 13 NO. EXP.= 12   CHI-SQ.=   0.2 DF= 1 SIG.= 0.683
    LEVEL 5 NO.<MED.=  2 NO. EXP.=  2     NO.>=MED.=  3 NO. EXP.=  3  TEST CANNOT BE RUN; EXP. NO. < 3
    OVERALL CHI-SQ=   0.5 DF=  7  SIG.= 0.999

0   ISSUE GROUP =   3   ISSUE =   5   S POOL DF, VOL I
```

```
     LEVEL 1 NO.<MED.=  2 NO. EXP.=  2     NO.>=MED.=  2 NO. EXP.=  2  TEST CANNOT BE RUN; EXP. NO. < 3
     LEVEL 2 NO.<MED.= 21 NO. EXP.= 17     NO.>=MED.= 14 NO. EXP.= 18   CHI-SQ.=   1.8 DF= 1 SIG.= 0.176
     LEVEL 3 NO.<MED.= 22 NO. EXP.= 23     NO.>=MED.= 24 NO. EXP.= 23   CHI-SQ.=   0.1 DF= 1 SIG.= 0.768
     LEVEL 4 NO.<MED.= 23 NO. EXP.= 25     NO.>=MED.= 27 NO. EXP.= 25   CHI-SQ.=   0.3 DF= 1 SIG.= 0.572
     LEVEL 5 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
     OVERALL CHI-SQ=   2.5 DF=  7  SIG.= 0.927

0    ISSUE GROUP =   3   ISSUE =   6   REVOL FROM RPV (FRVOL)

     LEVEL 1 NO.<MED.=  2 NO. EXP.=  2     NO.>=MED.=  2 NO. EXP.=  2  TEST CANNOT BE RUN; EXP. NO. < 3
     LEVEL 2 NO.<MED.= 24 NO. EXP.= 23     NO.>=MED.= 23 NO. EXP.= 24   CHI-SQ.=   0.1 DF= 1 SIG.= 0.770
     LEVEL 3 NO.<MED.= 41 NO. EXP.= 38     NO.>=MED.= 35 NO. EXP.= 38   CHI-SQ.=   0.5 DF= 1 SIG.= 0.491
     LEVEL 4 NO.<MED.=  7 NO. EXP.= 11     NO.>=MED.= 16 NO. EXP.= 12   CHI-SQ.=   2.8 DF= 1 SIG.= 0.095
     OVERALL CHI-SQ=   3.3 DF=  5  SIG.= 0.647

0    ISSUE GROUP =   3   ISSUE =   7   CCI REL

     LEVEL 1 NO.<MED.= 12 NO. EXP.=  9     NO.>=MED.=  6 NO. EXP.=  9   CHI-SQ.=   2.0 DF= 1 SIG.= 0.157
     LEVEL 2 NO.<MED.= 29 NO. EXP.= 31     NO.>=MED.= 33 NO. EXP.= 31   CHI-SQ.=   0.3 DF= 1 SIG.= 0.611
     LEVEL 3 NO.<MED.= 27 NO. EXP.= 27     NO.>=MED.= 28 NO. EXP.= 28   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 4 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
     OVERALL CHI-SQ=   2.5 DF=  7  SIG.= 0.925

0    ISSUE GROUP =   3   ISSUE =   8   RB DF

     LEVEL 1 NO.<MED.= 18 NO. EXP.= 12     NO.>=MED.=  7 NO. EXP.= 13   CHI-SQ.=   5.8 DF= 1 SIG.= 0.016
     LEVEL 2 NO.<MED.= 31 NO. EXP.= 29     NO.>=MED.= 27 NO. EXP.= 29   CHI-SQ.=   0.3 DF= 1 SIG.= 0.599
     LEVEL 3 NO.<MED.= 19 NO. EXP.= 26     NO.>=MED.= 33 NO. EXP.= 26   CHI-SQ.=   3.8 DF= 1 SIG.= 0.052
     LEVEL 4 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
     OVERALL CHI-SQ=  10.1 DF=  7  SIG.= 0.184

0    ISSUE GROUP =   3   ISSUE =   9   REF BAY DF

     LEVEL 1 NO.<MED.=  6 NO. EXP.=  6     NO.>=MED.=  6 NO. EXP.=  6   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 2 NO.<MED.= 13 NO. EXP.= 13     NO.>=MED.= 14 NO. EXP.= 14   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 3 NO.<MED.= 29 NO. EXP.= 28     NO.>=MED.= 28 NO. EXP.= 29   CHI-SQ.=   0.1 DF= 1 SIG.= 0.791
     LEVEL 4 NO.<MED.= 26 NO. EXP.= 27     NO.>=MED.= 28 NO. EXP.= 27   CHI-SQ.=   0.1 DF= 1 SIG.= 0.785
     OVERALL CHI-SQ=   0.1 DF=  7  SIG.= 1.000

0    ISSUE GROUP =   3   ISSUE =  10   LATE RELEASE FRACT, IODINE

     LEVEL 1 NO.<MED.=  5 NO. EXP.=  3     NO.>=MED.=  2 NO. EXP.=  4   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 2 NO.<MED.= 22 NO. EXP.= 24     NO.>=MED.= 27 NO. EXP.= 25   CHI-SQ.=   0.3 DF= 1 SIG.= 0.568
     LEVEL 3 NO.<MED.= 36 NO. EXP.= 36     NO.>=MED.= 37 NO. EXP.= 37   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 4 NO.<MED.= 11 NO. EXP.= 10     NO.>=MED.= 10 NO. EXP.= 11   CHI-SQ.=   0.2 DF= 1 SIG.= 0.662
     OVERALL CHI-SQ=   0.5 DF=  7  SIG.= 0.999
```

CONSEQUENCE MEASURE:
POP. DOSE 50 MI.

BASE CASE :
PEACH BOTTOM LLB (CRAC2)

ISSUE LEVELS FOR EACH SAMPLE MEMBER, IN ORDER OF INCREASING RISK

RISK	ISSUE LEVELS, FOR ALL ISSUES																															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1.596E-01	2	2	2	1	1	2	3	3	4	1	6	3	2	2	2	1	2	1	2	2	2	2	2	2	2	2	4	3	3	2	2	2
4.497E-01	2	2	3	1	1	3	2	3	2	1	6	2	2	2	1	3	5	2	1	1	1	2	2	3	5	4	3	3	1	2	4	2
4.707E-01	2	1	2	2	1	4	1	3	3	1	3	3	1	2	2	2	2	2	2	1	2	2	1	2	2	3	4	3	2	1	4	3
4.766E-01	2	2	2	2	2	2	3	3	3	1	8	2	2	1	1	2	2	1	2	2	1	2	1	2	1	2	3	2	1	1	4	3
5.783E-01	3	2	2	1	3	3	3	2	3	1	5	3	2	2	2	1	2	3	2	2	2	2	2	1	4	2	4	3	2	2	4	1
6.285E-01	3	2	3	2	1	2	3	2	2	1	7	2	2	2	1	3	1	2	2	1	1	1	3	3	2	2	1	2	2	2	4	3
7.220E-01	2	2	2	2	2	1	3	3	2	1	6	3	2	2	2	2	2	2	1	2	2	2	2	2	4	2	4	2	2	2	3	3
8.602E-01	3	2	3	2	3	2	4	3	1	1	8	3	1	2	2	3	4	2	2	2	1	2	2	2	4	2	2	2	2	2	1	2
9.336E-01	2	1	3	2	2	4	3	2	2	1	7	2	2	1	2	1	3	1	1	1	2	1	3	1	2	4	1	2	2	2	4	3
9.696E-01	2	2	2	1	2	2	2	3	3	1	9	2	2	2	1	2	4	2	2	2	2	2	1	2	4	5	4	2	2	2	4	3
9.904E-01	2	2	3	2	3	4	2	3	3	1	6	2	2	1	2	4	1	2	2	2	1	1	2	4	2	2	3	2	1	2	3	2
1.077E+00	2	2	2	2	2	2	2	2	3	1	6	2	2	1	1	1	1	1	2	2	1	2	2	1	2	4	2	3	3	2	1	3
1.103E+00	3	1	3	2	4	2	1	3	3	1	7	3	2	2	2	1	3	1	2	1	1	2	2	2	2	2	3	4	2	2	3	2
1.212E+00	3	2	3	1	1	3	3	4	2	1	5	3	2	1	1	2	3	2	1	2	1	2	3	3	1	2	3	3	1	3	4	3
1.350E+00	2	2	2	1	2	4	3	3	2	1	8	2	2	2	2	3	2	1	2	2	1	2	3	1	3	2	4	4	3	1	3	4
1.377E+00	2	2	2	1	2	3	1	3	3	1	3	2	2	2	1	3	2	2	2	2	1	2	1	3	3	2	2	2	3	4	3	3
1.409E+00	3	3	3	1	1	1	2	2	3	1	4	3	2	1	2	2	2	2	2	1	2	2	3	1	2	2	2	3	1	2	4	3
1.429E+00	1	2	2	2	2	2	3	2	2	1	4	3	2	2	1	3	2	2	1	2	1	2	2	1	3	1	2	3	4	3	4	2
1.479E+00	4	2	3	2	2	3	3	1	2	2	7	2	2	2	1	2	1	2	2	2	1	2	2	3	3	3	2	3	3	1	4	3
1.616E+00	1	2	2	1	2	2	3	3	3	1	5	2	2	2	1	2	4	1	2	1	2	1	4	4	1	5	3	3	3	2	1	2
1.639E+00	3	3	1	1	1	2	3	4	3	1	6	2	2	2	2	2	1	2	2	2	2	2	2	3	4	2	3	2	3	2	2	3
1.649E+00	3	2	1	1	2	2	3	2	1	1	1	3	2	1	1	1	2	1	1	2	1	2	2	4	3	4	4	3	2	1	3	3
1.661E+00	3	1	2	2	1	2	1	2	1	1	8	3	2	1	2	3	4	2	2	2	1	2	3	2	3	1	2	2	4	4	4	3
1.665E+00	2	3	1	1	3	3	3	4	3	2	5	2	2	1	2	3	3	2	1	2	2	2	3	2	4	2	3	3	2	1	3	2
1.709E+00	2	2	3	2	2	3	3	4	4	1	6	2	2	2	1	1	2	2	2	2	2	2	2	3	2	2	3	3	3	1	3	4
1.754E+00	2	2	2	2	2	3	3	2	2	1	9	2	2	2	1	2	3	2	1	2	2	2	2	3	1	3	5	3	3	3	4	4
1.807E+00	1	1	2	1	2	2	4	2	2	2	6	2	2	2	1	2	4	1	1	1	2	2	2	3	4	3	4	4	4	4	3	3
1.874E+00	3	3	2	2	3	3	3	1	1	1	9	3	2	1	1	1	3	2	2	1	2	2	1	3	2	3	4	2	2	1	2	1
1.882E+00	3	2	2	1	1	1	3	2	2	1	5	2	2	2	1	3	4	2	1	2	1	2	2	2	3	3	5	2	2	2	4	4
1.987E+00	3	3	2	1	1	2	3	3	2	1	6	2	2	1	2	2	2	2	2	2	2	2	2	4	3	2	4	4	1	1	1	2
2.150E+00	2	3	2	1	2	4	3	2	3	2	6	2	2	1	1	2	1	1	2	1	2	2	1	3	4	1	4	4	2	2	3	2
2.193E+00	3	1	2	1	2	3	1	4	2	1	2	2	2	1	1	2	3	2	2	1	2	1	2	1	2	2	3	2	2	2	2	4
2.206E+00	2	3	3	1	1	3	2	3	3	2	7	2	2	2	1	2	2	2	2	2	1	2	2	3	4	1	3	3	2	3	4	3
2.501E+00	3	2	2	1	2	4	2	3	3	1	8	3	2	1	2	2	1	1	1	2	2	2	3	1	4	3	4	3	3	2	3	3
2.587E+00	3	2	2	1	2	3	3	2	3	1	9	2	2	1	1	2	1	2	1	2	2	1	1	4	4	2	3	3	3	2	3	2
2.593E+00	2	2	2	1	4	2	2	3	2	1	7	3	2	1	2	1	1	2	2	2	1	2	2	3	4	2	3	3	3	2	4	4
2.599E+00	3	2	4	1	3	3	3	2	3	2	2	2	2	2	1	3	3	1	2	2	1	2	3	1	4	3	5	1	2	3	4	3
2.613E+00	4	2	1	2	2	3	2	1	4	1	4	3	2	1	1	2	1	2	1	1	1	1	3	2	4	3	4	4	2	4	4	3
2.645E+00	2	1	4	1	3	2	3	1	3	1	6	2	2	2	2	2	2	3	1	2	2	2	2	3	2	2	3	3	1	3	2	3
2.648E+00	3	2	3	1	3	4	3	2	2	2	8	2	2	1	2	2	2	1	2	1	2	2	1	3	5	3	2	3	1	3	3	4
2.682E+00	3	3	2	1	2	2	2	3	2	1	6	2	2	1	2	2	1	1	2	1	2	2	1	2	2	2	3	3	2	3	3	2
2.691E+00	1	1	3	2	2	3	4	2	2	1	2	2	2	2	2	1	3	2	1	2	1	1	2	2	3	3	3	2	2	3	2	3
2.732E+00	2	2	2	1	3	4	3	2	2	1	6	3	2	2	2	3	5	2	1	1	2	2	1	4	2	2	2	3	2	2	4	3
2.759E+00	3	2	1	1	3	1	1	3	4	1	9	2	2	2	2	2	4	2	2	2	1	2	2	2	2	4	2	3	2	3	3	2
2.785E+00	2	2	3	1	3	3	2	1	3	1	5	2	2	2	2	2	3	1	1	2	2	2	1	3	1	2	5	3	1	2	3	1
2.806E+00	3	2	3	1	2	2	3	3	4	1	6	2	2	2	1	4	4	2	2	1	2	2	3	3	3	2	3	2	3	2	3	4
2.838E+00	2	1	3	1	3	1	3	3	3	1	3	2	2	2	1	2	4	1	2	2	1	1	1	1	3	2	5	4	2	1	2	3
2.863E+00	3	2	1	2	3	2	3	2	3	1	2	3	1	1	2	3	3	1	2	2	2	2	2	3	1	2	2	3	2	3	3	3
2.896E+00	3	3	4	2	2	3	2	3	2	1	7	2	1	1	1	2	1	2	2	1	1	2	2	4	3	2	2	1	2	3	2	3
2.912E+00	3	2	3	2	2	2	3	2	1	1	5	3	2	2	1	2	2	2	2	2	1	1	2	2	4	4	4	3	2	1	4	3
2.944E+00	3	2	1	2	3	3	3	3	3	2	5	2	2	1	1	2	5	2	2	2	1	2	2	2	2	2	3	2	2	2	2	3
2.968E+00	1	3	2	1	3	3	4	2	3	1	3	3	2	1	2	2	2	3	2	2	2	2	2	1	2	2	3	2	1	3	3	2
2.972E+00	3	2	3	1	3	2	2	2	2	1	3	2	2	2	2	3	3	2	2	2	1	2	2	3	4	2	1	4	3	3	3	3
3.047E+00	2	3	3	1	3	2	2	3	4	2	8	2	2	1	2	3	2	1	2	1	1	2	2	2	2	4	4	2	2	2	4	2
3.056E+00	4	2	4	2	1	3	3	2	3	1	6	3	2	1	2	3	1	2	2	2	1	2	1	3	1	4	4	4	3	4	3	2
3.066E+00	2	1	3	2	2	1	2	3	4	1	5	2	2	2	1	2	2	3	1	2	2	2	2	3	1	2	3	3	4	2	4	2
3.075E+00	1	1	3	1	2	3	4	2	2	1	3	3	2	1	2	2	2	1	1	2	1	2	2	1	2	2	2	2	3	3	3	3
3.165E+00	2	3	3	2	2	2	2	2	2	1	2	3	2	1	2	3	2	2	2	2	2	2	2	2	5	2	2	3	4	2	2	3
3.240E+00	1	3	3	1	2	3	2	1	3	1	6	2	2	2	2	3	5	3	2	1	1	2	2	4	4	3	4	3	3	1	1	3
3.306E+00	3	3	1	2	2	3	2	2	1	1	6	1	1	1	1	4	3	2	2	2	2	2	2	1	3	1	4	2	1	3	4	2
3.382E+00	3	2	2	1	3	3	3	4	2	1	6	2	2	1	2	3	1	2	1	1	1	2	3	3	3	1	5	3	3	1	3	4
3.484E+00	2	2	3	2	2	3	4	2	2	1	9	3	2	2	1	3	3	2	1	1	1	2	1	1	4	3	4	2	2	4	1	2
3.579E+00	3	2	2	1	3	2	3	3	4	1	7	2	1	1	1	2	3	2	2	2	2	2	3	3	4	4	2	3	3	3	3	1
3.666E+00	1	2	2	2	4	3	2	3	3	1	8	2	2	1	1	2	3	3	2	2	1	2	3	3	4	1	4	2	2	2	4	2
3.735E+00	1	3	3	2	1	3	2	2	3	2	3	2	2	1	2	3	3	1	1	1	2	2	2	4	4	2	2	3	3	1	3	2
3.760E+00	1	2	3	1	3	2	3	2	2	1	6	2	2	1	1	2	1	2	1	1	2	2	4	3	2	1	4	4	3	4	1	2
3.808E+00	3	2	2	2	2	3	2	3	4	1	2	2	2	1	1	3	5	2	2	1	1	1	2	3	3	3	5	4	3	3	4	2
3.823E+00	4	2	2	1	3	2	3	2	3	1	3	2	2	1	1	3	2	1	2	2	2	1	2	3	4	1	4	2	3	1	4	3
3.951E+00	1	2	2	2	4	4	1	2	2	1	2	2	2	1	2	2	1	1	2	2	2	1	1	2	5	5	4	1	3	2	3	2
3.959E+00	3	2	3	2	3	2	3	4	2	1	8	2	2	2	1	2	3	1	2	1	1	2	1	3	4	2	5	3	3	2	3	3
3.970E+00	3	2	3	1	3	3	2	2	2	1	7	3	2	1	2	3	4	3	1	1	1	2	2	2	2	3	5	3	2	3	2	3
4.006E+00	2	2	1	1	3	2	2	4	1	1	6	2	2	2	2	3	3	1	1	1	2	2	2	3	2	2	2	3	4	3	3	3
4.137E+00	4	3	3	1	3	2	3	1	3	2	6	3	2	2	2	3	3	1	2	2	2	2	1	1	3	2	2	2	3	2	2	2
4.302E+00	4	2	1	1	2	4	1	1	4	1	8	3	2	2	2	1	3	2	1	1	1	2	2	2	4	2	4	3	1	3	2	3
4.318E+00	3	1	2	1	2	3	2	2	2	2	5	2	2	1	2	2	3	2	2	1	2	2	3	2	2	4	3	3	3	3	3	4
4.326E+00	4	3	3	2	2	3	3	1	2	1	4	2	1	1	2	2	5	1	2	2	1	2	3	2	2	2	4	2	3	1	4	3

BEST COPY AVAILABLE

```
4.600E+00  2  2  3  2  3  1  2  2  3  1  8  2  2  1  1  2  4  1  1  1  2  1  2  1  2  2  4  4  3  1  3  3
4.619E+00  2  1  2  2  3  3  2  1  2  2  6  2  2  1  1  2  3  1  2  2  2  2  2  2  3  1  4  2  3  3  3  1
4.683E+00  3  3  2  1  3  3  1  1  4  1  5  3  2  1  2  2  3  1  2  2  2  2  2  3  1  2  4  3  3  1  2  3
4.796E+00  2  1  4  1  4  2  3  2  2  1  4  3  2  2  2  2  3  1  2  1  1  2  2  4  3  2  4  4  2  3  4  3
4.923E+00  2  3  1  2  3  3  2  3  2  1  4  2  2  2  1  2  2  2  2  1  1  2  3  3  2  3  3  3  4  1  3  2
5.065E+00  3  2  3  2  3  2  2  3  3  1  3  2  2  1  2  2  1  3  1  1  2  2  1  3  3  3  4  4  4  3  4  2
5.694E+00  3  2  3  1  4  1  3  3  2  1  6  2  2  1  1  2  4  2  1  1  2  2  3  3  5  4  2  3  2  3  3  3
5.784E+00  2  3  4  2  3  2  2  2  3  1  5  2  1  2  2  2  2  1  1  1  1  2  3  1  2  2  3  3  2  2  2  3
5.900E+00  4  3  3  1  2  3  3  3  2  1  6  2  2  1  2  2  2  1  2  1  2  2  2  3  3  4  2  3  3  2  2  3
6.048E+0C  2  3  4  2  3  3  3  2  3  2  3  2  2  2  2  2  1  1  1  2  2  2  2  3  5  1  4  3  1  3  3  2
6.063E+00  3  3  1  1  2  3  4  3  3  1  3  3  2  2  1  2  2  1  1  2  1  2  2  2  2  2  2  3  3  1  4  3
6.070E+00  3  2  3  1  2  3  1  2  2  2  2  2  2  2  1  2  2  2  1  2  1  1  3  2  2  1  3  2  3  3  2  2
6.107E+00  4  2  1  2  3  4  4  2  2  1  6  2  2  2  2  2  4  1  1  2  2  1  3  3  2  2  3  2  3  2  3  3
6.126E+00  2  2  4  1  4  2  3  3  3  1  6  2  2  2  1  3  2  2  2  2  1  2  1  1  2  2  2  3  2  1  4  3
6.228E+00  2  3  3  2  2  3  2  2  4  2  9  2  2  1  1  3  2  2  1  1  2  2  2  1  1  2  3  4  2  2  3  3
6.396E+00  3  3  2  2  2  2  3  2  2  1  8  2  2  1  2  2  2  2  2  2  2  2  3  2  2  2  5  3  3  3  4  3
6.556E+00  3  3  4  2  2  1  2  3  3  1  4  2  2  2  2  3  5  2  1  2  2  2  2  3  2  2  4  3  2  2  4  4
6.578E+00  2  3  2  1  2  2  3  2  4  1  7  2  2  1  2  3  3  1  1  2  1  2  1  2  3  1  1  3  2  2  2  3
6.592E+00  1  3  2  1  2  2  2  3  2  1  8  2  2  1  1  2  2  1  2  2  1  2  3  2  3  2  3  3  2  3  1  2
6.671E+00  3  2  2  1  3  1  2  2  2  1  9  2  2  2  1  3  1  3  2  1  2  2  2  3  2  3  3  4  2  3  4  3
6.675E+00  2  3  2  1  2  2  1  3  1  1  4  2  2  1  2  2  3  2  1  2  2  2  1  2  1  2  2  2  2  2  4  3
6.745E+00  3  1  4  1  3  3  2  4  3  1  8  3  2  1  1  3  5  1  1  2  2  1  2  1  2  3  3  4  3  2  1  1
6.884E+00  2  3  2  2  3  2  2  2  2  1  4  1  2  2  2  1  3  2  2  1  1  2  2  1  4  2  2  3  2  2  3  4
7.200E+00  3  3  2  1  2  1  2  3  3  1  2  2  2  2  2  2  3  2  2  1  1  2  1  2  3  3  4  3  2  4  4  3
7.250E+00  2  3  3  2  3  3  2  3  2  1  1  2  2  1  1  3  2  2  2  2  2  2  3  2  4  4  4  2  2  3  1  3
7.545E+00  2  3  2  1  2  1  2  3  1  1  5  3  2  2  1  2  1  1  2  2  1  2  2  1  2  5  2  4  1  2  2  2
7.549E+00  4  3  3  1  2  3  2  3  2  1  3  2  2  1  1  2  4  1  1  1  2  2  3  4  2  1  4  2  3  2  2  2
7.885E+00  3  3  2  2  2  2  3  3  3  2  6  2  1  2  2  3  2  1  1  1  1  2  2  3  1  3  3  2  2  3  3  3
8.291E+00  2  3  2  1  2  2  4  2  4  1  5  3  2  1  2  2  5  2  1  1  1  2  1  2  2  2  3  2  3  3  3  2
8.315E+00  1  3  3  2  3  2  3  3  4  1  7  3  2  2  2  2  2  2  1  1  2  2  3  2  3  2  4  2  2  2  2  2
8.374E+00  2  3  4  2  2  3  1  2  3  1  6  3  2  2  2  2  2  1  1  2  1  2  2  4  2  2  3  2  4  2  4  2
8.550E+00  3  2  3  1  3  3  4  4  3  1  7  2  2  2  1  3  2  1  1  1  1  2  4  3  2  3  2  3  3  3  4  2
8.589E+00  3  3  3  2  2  3  3  3  2  1  6  2  1  2  1  2  4  3  2  1  1  1  2  3  3  4  3  4  2  1  4  2
8.773E+00  3  3  3  2  2  2  2  2  1  1  9  3  2  2  2  3  3  1  1  2  2  1  3  2  2  3  4  3  3  3  4  3
8.852E+00  2  3  2  1  2  3  3  3  2  1  8  1  2  1  2  2  4  3  1  1  1  2  1  3  3  2  4  3  4  3  4  3
9.215E+00  2  3  2  1  3  2  3  3  1  2  5  2  1  2  2  2  2  2  1  2  2  2  2  1  4  3  3  3  3  2  4  2
9.306E+00  1  3  1  1  2  3  2  2  3  1  5  1  2  2  2  2  2  1  1  1  1  1  1  2  2  2  4  4  3  1  3  2
9.347E+00  2  2  2  1  4  2  3  2  1  1  9  2  2  1  2  3  1  1  1  1  1  1  2  4  4  2  3  2  3  3  4  2
9.366E+00  2  2  2  2  3  1  1  3  1  1  2  2  2  1  1  3  3  1  1  2  2  2  1  2  3  2  2  3  2  4  4  2
9.844E+00  2  3  3  1  3  3  2  1  1  1  7  2  2  1  1  2  2  2  2  2  2  2  2  2  1  1  3  3  3  2  3  3
1.028E+01  4  3  3  2  3  3  2  4  3  2  3  3  2  1  2  3  2  2  1  1  1  1  3  2  4  4  2  3  2  3  3  3
1.050E+01  2  3  3  1  3  2  3  2  3  1  7  2  1  1  2  3  2  1  1  1  1  2  2  3  3  2  4  3  2  2  4  4
1.096E+01  2  3  1  1  3  2  3  3  3  1  7  3  2  2  1  3  2  1  2  2  2  1  2  2  2  2  4  3  2  3  3  2
1.115E+01  3  3  4  1  3  2  1  4  3  2  7  2  1  1  1  1  2  1  1  2  2  1  3  4  3  4  3  3  1  3  4  3
1.175E+01  2  3  2  1  3  2  3  2  3  1  7  2  2  2  1  2  1  3  1  2  1  2  3  3  2  4  4  2  3  4  2  2
1.266E+01  3  3  3  1  3  3  2  2  2  1  6  2  2  2  1  1  5  1  1  2  1  2  2  1  2  4  4  3  3  3  2  4
1.282E+01  3  3  3  2  3  1  3  1  2  1  3  3  2  2  1  3  3  2  1  2  2  1  3  1  4  3  5  2  3  3  3  2
1.296E+01  3  2  3  1  3  2  2  3  1  1  5  2  2  2  2  3  1  2  1  1  2  1  1  2  2  3  5  1  2  1  1  4
1.342E+01  4  2  2  2  3  2  4  2  3  1  3  2  2  2  1  2  1  2  1  2  2  2  2  3  4  2  2  4  2  4  3  4
1.434E+01  3  3  2  1  4  1  2  2  2  1  9  2  2  1  2  2  4  1  1  2  1  2  2  2  2  2  3  3  1  3  4  2
1.575E+01  2  3  3  1  4  2  2  3  3  1  6  2  2  2  1  2  4  2  1  1  1  2  3  3  3  4  3  2  1  2  4  3
2.227E+01  3  4  2  2  4  3  2  3  2  1  5  2  2  2  2  2  4  2  2  1  2  2  3  3  2  2  3  2  3  2  4  2
2.242E+01  3  3  2  2  2  2  2  3  2  1  3  3  2  2  2  2  3  1  1  1  1  1  2  4  3  2  2  3  2  4  2  3
2.337E+01  2  3  2  1  2  3  2  1  3  1  5  2  1  1  1  3  5  2  1  2  1  2  1  2  2  5  2  3  3  2  2  3
2.798E+01  4  2  3  1  4  2  3  4  3  2  6  2  1  1  2  2  3  2  1  1  2  2  2  1  2  2  4  2  4  2  1  3
3.369E+01  3  3  2  1  3  2  2  2  2  1  7  3  2  1  1  3  1  3  1  2  1  2  3  1  3  4  4  4  2  3  3  1
3.397E+01  2  3  2  2  3  3  3  2  2  1  7  3  2  1  1  4  3  2  1  2  1  2  2  2  3  3  3  3  2  3  2  4
3.502E+01  3  3  2  2  3  4  4  3  3  1  5  3  2  1  1  1  5  2  1  2  1  2  1  3  2  2  3  2  2  4  4  2
3.746E+01  2  4  2  1  3  3  2  3  3  1  6  3  2  1  1  2  4  1  2  2  1  2  2  1  5  2  3  2  3  2  3  3
3.795E+01  3  4  4  1  3  2  2  4  2  2  8  2  2  2  2  2  4  2  2  2  2  1  1  3  3  2  3  3  4  2  3  3
4.429E+01  2  4  3  1  4  2  2  2  3  2  7  3  2  2  1  2  1  2  2  1  2  2  3  2  1  3  2  2  4  1  2  3
4.521E+01  3  4  4  1  2  3  3  2  2  1  3  2  2  2  2  3  1  2  1  2  2  2  2  2  2  4  4  3  1  2  3  3
5.226E+01  3  4  3  1  2  2  2  2  3  1  6  3  2  2  2  3  5  1  1  2  1  2  2  2  4  2  5  3  2  2  3  4
5.558E+01  2  3  4  1  4  4  3  3  3  1  3  3  2  2  2  3  1  1  1  1  2  2  1  2  4  4  3  2  3  2  4  3
5.980E+01  1  4  3  2  1  3  2  3  3  1  9  2  2  1  1  2  2  1  1  2  2  2  2  1  4  3  4  2  2  3  4  3
6.220E+01  2  4  3  2  2  3  2  3  2  1  3  3  2  1  2  2  5  1  2  2  2  2  2  2  2  2  3  3  2  3  3  2
1.001E+02  3  4  2  2  3  2  2  3  2  1  3  3  2  2  1  2  5  3  2  1  2  2  3  2  2  2  4  3  2  3  3  4
1.033E+02  2  4  2  1  2  3  4  4  3  1  5  3  2  1  1  3  1  2  1  1  1  1  1  2  3  4  4  2  4  3  3  3
1.419E+02  2  4  3  1  3  4  2  3  2  1  6  2  2  2  1  3  3  1  2  2  2  2  3  3  2  2  2  3  2  4  3  3
1.526E+02  3  4  3  1  4  3  3  1  3  2  6  2  2  1  1  2  4  1  2  2  1  1  2  2  2  3  4  3  2  4  4  4
1.793E+02  4  4  3  2  1  2  4  3  2  1  5  1  2  1  1  2  1  2  1  2  1  2  1  2  3  2  2  4  4  2  3  2
2.762E+02  4  4  3  2  2  3  2  2  2  1  6  3  2  1  1  2  3  2  1  2  1  2  3  2  4  2  2  3  3  3  3  3
3.623E+02  2  4  3  1  3  4  1  2  3  1  6  2  2  2  1  3  2  3  1  2  1  2  1  2  2  2  5  3  3  2  3  4

    MEAN =     1.679E+01     VARIANCE =     1.959E+03

    PERCENTILES :
         5-TH =     8.602E-01  50-TH =     4.322E+00  95-TH =     6.221E+01
    LOGARITHMIC MIDPOINT (OF POINTS > 0.) =     7.605E+00
    NUMBER ABOVE MIDPOINT = 47
    NUMBER BELOW MIDPOINT = 103
    CHI-SQUARED(1) =     2.091E+01
    REJECT NULL (p < .01)
```

```
CONSEQUENCE MEASURE:
  POP. DOSE 50 MI.


  BASE CASE :
   PEACH BOTTOM LLH (CRAC2)

  FRACTIONAL CONTRIBUTION OF EACH SEQUENCE TO MEAN RISK
                 SEQUENCE              CONTRIBUTION
                 TB                          0.1431
                 TBUX                        0.8101
                 TBU                         0.0053
                 TCSX                        0.0109
                 TCUX                        0.0038
                 TCSRX2                      0.0213
                 TCSRV23                     0.0055
```

```
CONSEQUENCE MEASURE:
  POP. DOSE 50 MI.


  BASE CASE :
   PEACH BOTTOM LLH (CRAC2)

  FRACTIONAL CONTRIBUTION OF EACH NONZERO BIN TO MEAN RISK
                  BIN                       CONTRIBUTION
          AAACAAGEFABCCABBEDABBB               0.0002
          AAACAAGEFABCCABBEEABBB               0.0002
          AAACACGEFABCCABBEDABBB               0.0002
          AAACACGEFABCCABBEEABBB               0.0001
          AAACACGGDABCBABBECABBB               0.0004
          AAACACGGDABCBABBEDABBB               0.0007
          AAACACGGDABCBABBEEABBB               0.0007
          AAACACGGDABCBADBECABBB               0.0001
          AAACACGGDABCBADBEDABBB               0.0004
          AAACACGGDABCBADBEEABBB               0.0006
          BAACAAGBDAACBBBBHHABBB               0.0002
          BAACAAGBDAACBDDBHHABBB               0.0001
          BAACAAGBDABCBBBBHHABBB               0.0003
          BAACAAGBDABCBDDBHHABBB               0.0001
          BAACAAGBFAACCBBBHHABBB               0.0001
          BAACAAGBFABCCBBBHHABBB               0.0003
          BAACAAGBFABCCDDBHHABBB               0.0001
          BAACACGBDAACBBBBHHABBB               0.0032
          BAACACGBDAACBDDBHHABBB               0.0019
          BAACACGBDABCBBBBHHABBB               0.0005
          BAACACGBDABCBDDBHHABBB               0.0003
          BAACACGBFAACCBBBHHABBB               0.0010
          BAACACGBFAACCDDBHHABBB               0.0002
          BAACACGBFABCCBBBHHABBB               0.0007
          BAACACGBFABCCDDBHHABBB               0.0001
          BAACACGGDAACBABBDDABBB               0.0003
          BAACACGGDAACBADBDDABBB               0.0001
          BAACACGGDABCBABBDEABBB               0.0001
          BAACCCGBDAACBDDBHHABBB               0.0001
          BAACCCGBFAACCBBBHHABBB               0.0001
          BABBACGCFAACCBBBHHABBB               0.0001
          BABBACGGDAACBABBEGABBB               0.0001
          BABBACGGDABCBABBEGABBB               0.0001
          BABBACGGDABCBADBEGABBB               0.0001
          BACBAAGCFABCCBBBHHABBB               0.0004
          BACBAAGCFABCCDDBHHABBB               0.0001
          CAACAABGDDACBABBADABAB               0.0001
          CAACAABGDDACBABBAEABAB               0.0001
          CAACAABGFDACBCCBACABAB               0.0001
          CAACAABGFDACBCCBADABAB               0.0001
          CAACAABGFDACBCCBAEABAB               0.0001
          CAACACBGDABCBABBADABAB               0.0001
          CAACACBGDABCBABBAEABAB               0.0001
          CAACACBGDDACBABBADABAB               0.0002
          CAACACBGDDACBABBAEABAB               0.0003
          CAACACBGDDACBCDBACABAB               0.0002
          CAACACBGDDACBCDBADABAB               0.0002
          CAACACBGDDACBCDBAEABAB               0.0006
          CAACACBGDDACBCDBAFABAB               0.0002
          CAACACBGFDACBCCBACAHAB               0.0001
          CAACACBGFDACBCCBADALAB               0.0001
          CAACACBGFDACBCCBAEAEAB               0.0001
```

BEST COPY AVAILABLE

313

CAACACBGFDACBCDBACABAB	0.0001
CAACACBGFDACBCDBADABAB	0.0003
CAACACBGFDACBCDBAEABAB	0.0003
CAACCCBGDDACBABBADABAB	0.0001
CAACCCBGDDACBABBAEABAB	0.0002
CAACCCBGDDACBCDBADABAB	0.0001
CAACCCBGDDACBCDBAEABAB	0.0001
CAACCCBGFDACBCCBADABAB	0.0001
CAACCCBGFDACBCCBAEABAB	0.0001
CAACCCBGFDACBCDBAEABAB	0.0001
DAAAAAGBDABCBBBBHHABBB	0.0009
DAAAAAGBDABCBDDBHHABBB	0.0002
DAAAAAGBDDACBBBBHHABBB	0.0004
DAAAAAGBDDACBDDBHHABBB	0.0005
DAAAAAGBFABCCBBBHHABBB	0.0009
DAAAAAGBFABCCDDBHHABBB	0.0002
DAAAAAGBFDACCBBBHHABBB	0.0013
DAAAAAGBFDACCDDBHHABBB	0.0004
DAAAACGBDABCBBBBHHABBB	0.0008
DAAAACGBDABCBDDBHHABBB	0.0001
DAAAACGBDDACBBBBHHABBB	0.0025
DAAAACGBDDACBBBBHHBABB	0.0001
DAAAACGBDDACBDDBHHABBB	0.0024
DAAAACGBFABCCBBBHHABBB	0.0010
DAAAACGBFABCCDDBHHABBB	0.0002
DAAAACGBFDACCBBBHHABBB	0.0019
DAAAACGBFDACCDDBHHABBB	0.0004
DAAAACGGDDACBBBBADABAB	0.0001
DAAAACGGDDACBBBBAEABAB	0.0004
DAAAACGGDDACBDDBADABAB	0.0001
DAAAACGGDDACBDDBAEABAB	0.0004
DAAAACGGDDACBDDBAGABAB	0.0001
DAAACCGBDDACBBBBHHABBB	0.0005
DAAACCGBDDACBDDBHHABBB	0.0002
DAAACCGBFDACCBBBHHABBB	0.0001
DAAACCGBFDACCDDBHHABBB	0.0001
DABAAAGADABCBBBBHGABAB	0.0001
DABAAAGADABCBDDBHGABAB	0.0004
DABAAAGADDACBBBBHGABAB	0.0002
DABAAAGADDACBDDBHGABAB	0.0002
DABAACGADABCBBBBHGABAB	0.0012
DABAACGADABCBDDBHGABAB	0.0003
DABAACGADDACBBBBHGABAB	0.0021
DABAACGADDACBDDBHGABAB	0.0008
DACAAAGADABCCBBBHHABBB	0.0002
DACAAAGADABCCDDBHHABBB	0.0001
DACAAAGADDACCBBBHHABBB	0.0001
EBAACCFGFDBCBADBEHABBB	0.0001
EBAACCFGFDBCBADBEHBBBB	0.0002
EBAACCGGDDBCBABBEGABBB	0.0002
EBAACCGGDDBCBABBEGBBBB	0.0003
EBAACCGGDDBCBABBEHABBB	0.0014
EBAACCGGDDBCBABBEHBBBB	0.0019
EBAACCGGDDBCBADBEHABBB	0.0007
EBAACCGGDDBCBADBEHBBBB	0.0004
EBAACCGGEDBCBADBEHBBBB	0.0001
EBACBBDEECBCCABBFBBABA	0.0001
EBACBBGEFCBCCABBFBBABA	0.0001
EBACBBGEFCBCCABBFCBABA	0.0007
EBACBBGEFCBCCABBFEABBA	0.0011
EBACBBGEFCBCCABBFFABBA	0.0001
EBACBBGEFCBCCABBFGABBA	0.0001
EBACBBGGDCBBBABBFFABBA	0.0001
EBACBBGGDCBCBABBFBBABA	0.0093
EBACBBGGDCBCBABBFCBABA	0.0030
EBACBBGGDCBCBABBFDABBA	0.0004
EBACBBGGDCBCBABBFEABBA	0.0016
EBACBBGGDCBCBABBFFABBA	0.0010
EBACBBGGDCBCBABBFGABBA	0.0001
EBACBCDEECBCCABBFBBABA	0.0001
EBACBCGEFCBCCABBFBBABA	0.0001
EBACBCGEFCBCCABBFCABBA	0.0001
EBACBCGEFCBCCABBFCBABA	0.0006
EBACBCGEFCBCCABBFEABBA	0.0003
EBACBCGEFCBCCABBFFABBA	0.0001
EBACBCGGDCBBBABBFFABBA	0.0001
EBACBCGGDCBCBABBFBBABA	0.0065
EBACBCGGDCBCBABBFCBABA	0.0030
EBACBCGGDCBCBABBFDABBA	0.0006
EBACBCGGDCBCBABBFEABBA	0.0038
EBACBCGGDCBCBABBFFABBA	0.0010
EBACBCGGDCBCBABBFFBBBA	0.0010
EBACBCGGDCBCBABBFGABBA	0.0001
EBACBCGGDCBCBADBFBBABA	0.0022
EBACBCGGDCBCBADBFCBABA	0.0001
EBACBCGGDCBCBADBFEABBA	0.0003

```
EBACBCGGDCBCBADBFFABBA          0.0002
EBACCCDEEDBCCADBFBBABB          0.0001
EBACCCDGFDBCBABBFBBABB          0.0007
EBACCCDGFDBCBACBFBBABB          0.0002
EBACCCDGFDBCBADBFBBABB          0.0025
EBACCCFGFDBBBABBFBBABB          0.0008
EBACCCFGFDBBBABBFEABBB          0.0001
EBACCCFGFDBBBABBFFABBB          0.0001
EBACCCFGFDBBBACBFEABBB          0.0001
EBACCCFGFDBBBADBFCBABB          0.0007
EBACCCFGFDBBBADBFEABBB          0.0016
EBACCCFGFDBBBADBFFABBB          0.0001
EBACCCFGFDBCBABBFBBABB          0.0016
EBACCCFGFDBCBABBFCABBB          0.0001
EBACCCFGFDBCBABBFCBABB          0.0124
 EBACCCFGFDBCBABBFEABBB          0.0275
 EBACCCFGFDBCBABBFEBBBB          0.0007
 EBACCCFGFDBCBABBFFABBB          0.0003
 EBACCCFGFDBCBABBFGABBB          0.0001
 EBACCCFGFDBCBACBFBBABB          0.0001
 EBACCCFGFDBCBACBFCBABB          0.0021
 EBACCCFGFDBCBACBFEABBB          0.0007
 EBACCCFGFDBCBACBFFABBB          0.0001
 EBACCCFGFDBCBADBFBBABB          0.0012
 EBACCCFGFDBCBADBFCABBB          0.0006
 EBACCCFGFDBCBADBFCBABB          0.0232
 EBACCCFGFDBCBADBFDBBBB          0.0001
 EBACCCFGFDBCBADBFEABBB          0.0082
 EBACCCFGFDBCBADBFEBBDB          0.0041
 EBACCCFGFDBCBADBFFABBB          0.0012
 EBACCCFGFDBCBADBFGABBB          0.0001
 EBACCCGDFDBCBABBFABAAB          0.0002
 EBACCCGDFDBCBABBFBBABB          0.0004
 EBACCCGDFDBCCABBFBBABB          0.0001
 EBACCCGEFDBBCABBFBBABB          0.0004
 EBACCCGEFDBCCABBFBBABB          0.0008
 EBACCCGEFDBCCABBFCABBB          0.0001
 EBACCCGEFDBCCABBFCBABB          0.0004
 EBACCCGEFDBCCABBFEABBB          0.0014
 EBACCCGEFDBCCADBFCBABB          0.0052
 EBACCCGEFDBCCADBFEBBBB          0.0007
 EBACCCGFFDBCBABBFEABBB          0.0005
 EBACCCGFFDBCCABBFEABBB          0.0001
 EBACCCGGDDBBBABBFABABB          0.0026
 EBACCCGGDDBBBABBFBBABB          0.0001
 EBACCCGGDDBBBABBFEABBB          0.0010
 EBACCCGGDDBBBABBFFABBB          0.0007
 EBACCCGGDDBBBABBFGABBB          0.0001
 EBACCCGGDDBBBADBFABABB          0.0018
 EBACCCGGDDBBBADBFCBABB          0.0007
 EBACCCGGDDBBBADBFEABBB          0.0002
 EBACCCGGDDBBBADBFFBBBB          0.0001
 EBACCCGGDDBCBABBFABABB          0.0968
 EBACCCGGDDBCBABBFBABAB          0.0001
 EBACCCGGDDBC[illegible]BBFBBABB          0.2909
 EBACCCGGDDBC[illegible]BBFCBABB          0.0211
 EBACCCGGDDBC[illegible]ABBFCBBBB          0.0017
 EBACCCGGDDBC[illegible]ABBFDABBB          0.0067
 EBACCCGGDDBC[illegible]ABBFDBBBB          0.0017
 EBACCCGGDDBC[illegible]ABBFEABBB          0.0298
 EBACCCGGDDBC[illegible]ABBFEBBBB          0.0269
 EBACCCGGDDBCBABBFFABBB          0.0239
 EBACCCGGDDBCBABBFFBBBB          0.0084
 EBACCCGGDDBCBABBFGABBB          0.0138
 EBACCCGGDDBCBADBFABABB          0.0356
 EBACCCGGDDBCBADBFBBABB          0.0273
 EBACCCGGDDBCBADBFCBABB          0.0041
 EBACCCGGDDBCBADBFEABBB          0.0122
 EBACCCGGDDBCBADBFEBBBB          0.0003
 EBACCCGGDDBCBADBFFABBB          0.0025
 EBACCCGGDDBCBADBFFBBBB          0.0034
 EBACCCGGDDBCBADBFGABBB          0.0001
 EBACCCGGEDBBBABBFBBABB          0.0022
 EBACCCGGEDBBBABBFEABBB          0.0001
 EBACCCGGEDBBBABBFFABBB          0.0001
 EBACCCGGEDBBBABBFFBBBB          0.0003
 EBACCCGGEDBBBADBFEABBB          0.0035
 EBACCCGGEDBCBABBFBBABB          0.0047
 EBACCCGGEDBCBABBFCABBB          0.0001
 EBACCCGGEDBCBABBFCBABB          0.0088
 EBACCCGGEDBCBABBFCBBBB          0.0012
 EBACCCGGEDBCBABBFEABBB          0.0096
 EBACCCGGEDBCBABBFEBBBB          0.0009
 EBACCCGGEDBCBABBFFABBB          0.0007
 EBACCCGGEDBC[illegible]BBFFBBBB          0.0006
 EBACCCGGEDBCBABBFGABBB          0.0005
```

EBACCCGGEDBCBABBFGBBBB	0.0002
EBACCCGGEDBCBADBFCBABB	0.0066
EBACCCGGEDBCBADBFEABBB	0.0058
EBACCCGGEDBCBADBFEBBBB	0.0005
EBACCCGGEDBCBADBFFBBBB	0.0002
EBBBACGEFBBCCABBDGABBB	0.0009
EBBBACGEFBBCCABBEGABBB	0.0010
EBBBACGGDBBBBABBDGABBB	0.0001
EBBBACGGDBBBBABBEGABBB	0.0001
EBBBACGGDBBCBABBDGABBB	0.0013
EBBBACGGDBBCBABBEGABBB	0.0017
EBBBACGGDBBCBADBDGABBB	0.0018
EBBBACGGDBBCBADBEGABBB	0.0018
FCACBBGEFCBCCABBEFABBA	0.0001
FCACBBGGDCBCBABBDBBABA	0.0001
FCACBBGGDCBCBABBDCBABA	0.0001
FCACBBGGDCBCBABBDDABBA	0.0001
FCACBBGGDCBCBABBDEABBA	0.0001
FCACBBGGDCBCBABBEBBABA	0.0001
FCACBBGGDCBCBABBEEABBA	0.0002
FCACBCGGDCBCBABBDBBABA	0.0001
FCACBCGGDCBCBABBDDABBA	0.0001
FCACBCGGDCBCBABBDEABBA	0.0001
FCACBCGGDCBCBABBEBBABA	0.0001
FCACBCGGDCBCBABBEEABBA	0.0002
FCACBCGGDCBCBADBDCBABA	0.0001
FCACBCGGDCBCBADBDFABBA	0.0001
FCACBCGGDCBCBADBECBABA	0.0001
FCACCCDEEDBCCADBEBBABB	0.0001
FCACCCDGFDBCBACBDBBABB	0.0001
FCACCCDGFDBCBACBEBBABB	0.0002
FCACCCDGFDBCBADBDFBABB	0.0009
FCACCCDGFDBCBADBDCBABB	0.0003
FCACCCDGFDBCBADBDDBBBB	0.0001
FCACCCDGFDBCBADBDEABBB	0.0004
FCACCCDGFDBCBADBEBBABB	0.0015
FCACCCDGFDBCBADBECBABB	0.0002
FCACCCFGFDBCBABBDEABBB	0.0005
FCACCCFGFDBCBABBDFABBB	0.0001
FCACCCFGFDBCBABBEBBABB	0.0001
FCACCCFGFDBCBABBECBABB	0.0002
FCACCCFGFDBCBABBEEABBB	0.0010
FCACCCFGFDBCBABBGEABBB	0.0005
FCACCCFGFDBCBADBCFABBB	0.0001
FCACCCFGFDBCBADBDEBBBB	0.0001
FCACCCFGFDBCBADBDFABBB	0.0001
FCACCCFGFDBCBADBEBBABB	0.0004
FCACCCFGFDBCBADBECBABB	0.0004
FCACCCFGFDBCBADBEEABBB	0.0013
FCACCCFGFDBCBADBEEBBBB	0.0001
FCACCCFGFDBCBADBEFABBB	0.0003
FCACCCFGFDBCBADBEGABBB	0.0004
FCACCCFGFDBCBADBGCBABB	0.0001
FCACCCGBDDBCBABBHHABBB	0.0002
FCACCCGBDDBCBABBHHBABB	0.0001
FCACCCGBDDBCBDDBHHABBB	0.0005
FCACCCGBDDBCBDDBHHBABB	0.0003
FCACCCGBFDBBCDDBHHABBB	0.0001
FCACCCGBFDBCCDDBHHABBB	0.0004
FCACCCGBFDBCCDDBHHBABB	0.0002
FCACCCGDFDBCBABBEBBABB	0.0002
FCACCCGDFDBCBADBDCBABB	0.0006
FCACCCGDFDBCCABBEBBABB	0.0001
FCACCCGEFDBCCABBEBBABB	0.0001
FCACCCGEFDBCCABBEEABBB	0.0002
FCACCCGEFDBCCADBEGABBB	0.0003
FCACCCGGDDBBBABBECBABB	0.0001
FCACCCGGDDBBBABBEEABBB	0.0038
FCACCCGGDDBBBADBGCBABB	0.0003
FCACCCGGDDBCBABBCABABB	0.0001
FCACCCGGDDBCBABBCBBABB	0.0030
FCACCCGGDDBCBABBDABABB	0.0023
FCACCCGGDDBCBABBDBBABB	0.0112
FCACCCGGDDBCBABBDCABBB	0.0003
FCACCCGGDDBCBABBDCBABB	0.0065
FCACCCGGDDBCBABBDDABBB	0.0015
FCACCCGGDDBCBABBDEABBB	0.0021
FCACCCGGDDBCBABBDEBBBB	0.0002
FCACCCGGDDBCBABBDFABBB	0.0019
FCACCCGGDDBCBABBDFBBBB	0.0003
FCACCCGGDDBCBABBDGABBB	0.0094
FCACCCGGDDBCBABBEABABB	0.0036
FCACCCGGDDBCBABBEBBABB	0.0114
FCACCCGGDDBCBABBECBABB	0.0023
FCACCCGGDDBCBABBEDABBB	0.0005
FCACCCGGDDBCBABBEEABBB	0.0115

FCACCCGGDDBCBABBEEBBBB	0.0005
FCACCCGGDDBCBABBEFABBB	0.0021
FCACCCGGDDBCBABBEFBBBB	0.0004
FCACCCGGDDBCBABBEGABBB	0.0007
FCACCCGGDDBCBABBGABABB	0.0003
FCACCCGGDDBCBABBGBBABB	0.0028
FCACCCGGDDBCBABBGCBABB	0.0011
FCACCCGGDDBCBABBGEABBB	0.0001
FCACCCGGDDBCBACBEABABB	0.0001
FCACCCGGDDBCBADBDABABB	0.0009
FCACCCGGDDBCBADBDBBABB	0.0009
FCACCCGGDDBCBADBDCBABB	0.0013
FCACCCGGDDBCBADBDEABBB	0.0010
FCACCCGGDDBCBADBDEBBBB	0.0001
FCACCCGGDDBCBADBDFABBB	0.0027
FCACCCGGDDBCBADBDGABBB	0.0027
FCACCCGGDDBCBADBEABABB	0.0017
FCACCCGGDDBCBADBEBBABB	0.0005
FCACCCGGDDBCBADBECBABB	0.0071
FCACCCGGDDBCBADBEEABBB	0.0017
FCACCCGGDDBCBADBEEBBBB	0.0001
FCACCCGGDDBCBADBEFABBB	0.0003
FCACCCGGDDBCBADBGCBABB	0.0004
FCACCCGGDDBCBADBGEABBB	0.0010
FCACCCGGEDBCBABBDEABBB	0.0002
FCACCCGGEDBCBADBDEABBB	0.0006
FCACCCGGEDBCBADBEBBABB	0.0005
FCACCCGGEDBCBABBECBABB	0.0002
FCACCCGGEDBCBABBEEABBB	0.0014
FCACCCGGEDBCBABBGEABBB	0.0009
FCACCCGGEDBCBABBGFABBB	0.0001
FCACCCGGEDBCBADBCFABBB	0.0001
FCACCCGGEDBCBADBDCBABB	0.0001
FCACCCGGEDBCBADBEGABBB	0.0001
FCBBAAGCDBBBBBBBHHABBB	0.0003
FCBBAAGCDBBBBDDBHHABBB	0.0002
FCBBAAGCDBBCBBBBHHABBB	0.0008
FCBBAAGCDBBCBDDBHHABBB	0.0002
FCBBAAGCFBBBCBBBHHABBB	0.0004
FCBBAAGCFBBBCDDBHHABBB	0.0001
FCBBAAGCFBBCCBBBHHABBB	0.0009
FCBBAAGCFBBCCDDBHHABBB	0.0004
FCBBAAGGDBBCBABBEGABBB	0.0001
FCBBACGCDBBBBBBBHHABBB	0.0004
FCBBACGCDBBBBDDBHHABBB	0.0003
FCBBACGCDBBCBBBBHHABBB	0.0013
FCBBACGCDBBCBBBBHHBBBB	0.0002
FCBBACGCDBBCBDDBHHABBB	0.0007
FCBBACGCDBBCBDDBHHBBBB	0.0001
FCBBACGCFBBBCBBBHHABBB	0.0004
FCBBACGCFBBBCDDBHHABBB	0.0001
FCBBACGCFBBCCBBBHHABBB	0.0011
FCBBACGCFBBCCBBBHHBBBB	0.0003
FCBBACGCFBBCCDDBHHABBB	0.0003
FCBBACGCFBBCCDDBHHBBBB	0.0001
FCBBACGEFBBBCABBEGABBB	0.0001
FCBBACGEFBBCCABBEGABBB	0.0006
FCBBACGEFBBCCABBEGBBBB	0.0001
FCBBACGEFBBCCADBEGABBB	0.0002
FCBBACGGDBBBBABBEGABBB	0.0002
FCBBACGGDBBBBADBEGABBB	0.0001
FCBBACGGDBBCBABBEGABBB	0.0009
FCBBACGGDBBCBABBEGBBBB	0.0001
FCBBACGGDBBCBADBEGABBB	0.0005
FCBBACGGDBBCBADBEGBBBB	0.0001
FCCBAAGCFBBACBBBHHABBB	0.0002
FCCBAAGCFBBACDDBHHABBB	0.0002
FCCBAAGCFBBBCBBBHHABBB	0.0020
FCCBAAGCFBBBCDDBHHABBB	0.0006
FCCBAAGCFBBCCBBBHHABBB	0.0054
FCCBAAGCFBBCCDDBHHABBB	0.0013

```
CONSEQUENCE MEASURE:
  POP. DOSE 50 MI.


  BASE CASE :
   PEACH BOTTOM LLH (CRAC2)

  FRACTIONAL CONTRIBUTIONS OF EACH RELEASE TO MEAN RISK
                  RELEASE                CONTRIBUTION
                  PCH  1D                   0.0001
                  PCH  2D                   0.0013
                  PCH  3D                   0.0348
                  PCH  4D                   0.0238
                  PCH  5D                   0.1369
                  PCH  6D                   0.0798
                  PCH  7D                   0.1187
                  PCH  8D                   0.4935
                  PCH  9D                   0.0707
                  PCH 10D                   0.0000
                  PCH 11D                   0.0000
                  PCH 12D                   0.0001
                  PCH 13D                   0.0000
                  PCH 14D                   0.0000
                  PCH 15D                   0.0006
                  PCH 16D                   0.0001
                  PCH 17D                   0.0000
                  PCH 18D                   0.0001
                  PCH 19D                   0.0004
                  PCH 20D                   0.0006
                  PCH 21D                   0.0015
                  PCH 22D                   0.0030
                  PCH 23D                   0.0013
                  PCH 24D                   0.0053
                  PCH 25D                   0.0000
                  PCH 26D                   0.0004
                  PCH 27D                   0.0011
                  PCH 28D                   0.0031
                  PCH 29D                   0.0016
                  PCH 30D                   0.0015
                  PCH 31D                   0.0020
                  PCH 32D                   0.0004
                  PCH 33D                   0.0010
                  PCH 34D                   0.0029
                  PCH 35D                   0.0000
                  PCH 36D                   0.0033
                  PCH 37D                   0.0014
                  PCH 38D                   0.0006
                  PCH 39D                   0.0009
                  PCH 40D                   0.0000
                  PCH 41D                   0.0027
                  PCH 42D                   0.0005
                  PCH 43D                   0.0004
                  PCH 44D                   0.0002
                  PCH 45D                   0.0006
                  PCH 46D                   0.0005
                  PCH 47D                   0.0012
                  PCH 48D                   0.0005
                  PCH 49D                   0.0000
                  PCH 50D                   0.0002
                  PCH 51D                   0.0001
                  PCH 52D                   0.0000
                  PCH 53D                   0.0000
                  PCH 54D                   0.0000
```

```
CONSEQUENCE MEASURE:
 POP. DOSE 50 MI.

 SENSITIVITY OF RISK TO ISSUES
 DISTRIBUTION OF RISK AT EACH LEVEL OF EACH ISSUE
 BASE CASE :
  PEACH BOTTOM LLH (CRAC2)

 GP ISS LVL NUM    5%          50%         MEAN        95%         R**2    F   DF      SIGNIF.
  1   1   1  15  0.1474E+01  0.3666E+01  0.7730E+01  0.3756E+02   0.02    0.8
( 3,146)    0.48NS
          3  60  0.9740E+00  0.3964E+01  0.1231E+02  0.4861E+02
          2  60  0.4737E+00  0.5337E+01  0.1856E+02  0.8018E+C2
          4  15  0.1705E+01  0.5900E+01  0.3670E+02  0.2479E+03
  1   2   1  15  0.5586E+00  0.2691E+01  0.2864E+01  0.6194E+01   0.47   42.4(  3,146)   0.00**
          2  60  0.5250E+00  0.2834E+01  0.3856E+01  0.1102E+02
          3  60  0.1766E+01  0.7040E+01  0.9448E+01  0.3383E+02
          4  15  0.2537E+02  0.6220E+02  0.1118E+03  0.3385E+03
  1   3   1  15  0.1642E+01  0.3306E+01  0.4340E+01  0.1052E+02   0.03    1.5(  3,146)   0.22NS
          2  60  0.5250E+00  0.3887E+01  0.1060E+02  0.3622E+02
          4  15  0.2610E+01  0.6126E+01  0.1370E+02  0.5279E+02
          3  60  0.8962E+00  0.4461E+01  0.2686E+02  0.1654E+03
  1   4   2  62  0.6830E+00  0.4139E+01  0.1650E+02  0.7524E+02   0.00    0.4(  1,148)   0.54NS
          1  88  0.1185E+01  0.4497E+01  0.1699E+02  0.5914E+02
  1   5   2  60  0.9514E+00  0.3642E+01  0.1341E+02  0.5702E+02   0.13    7.3(  3,146)   0.00**
          1  15  0.2068E+00  0.1661E+01  0.1731E+02  0.1362E+03
          3  60  0.1284E+01  0.5413E+01  0.1806E+02  0.6164E+02
          4  15  0.1366E+01  0.9347E+01  0.2467E+02  0.1185E+03
  2   1   1  15  0.8534E+00  0.5694E+01  0.5831E+01  0.1394E+02   0.01    0.3(  3,146)   0.84NS
          2  60  0.7353E+00  0.4929E+01  0.1278E+02  0.4811E+02
          3  60  0.1292E+01  0.4322E+01  0.1735E+02  0.8018E+02
          4  15  0.5586E+00  0.2732E+01  0.4153E+02  0.2866E+03
  2   2   3  60  0.6029E+00  0.2999E+01  0.8993E+01  0.3919E+02   0.07    3.8(  3,146)   0.01**
          2  60  0.1033E+01  0.6390E+01  0.1946E+02  0.7891E+02
          4  15  0.1036E+01  0.6107E+01  0.2566E+02  0.1562E+03
          1  15  0.5824E+00  0.4302E+01  0.2843E+02  0.1517E+03
  2   3   4  15  0.1307E+01  0.4006E+01  0.1505E+02  0.8045E+02   0.00    0.0(  3,146)   0.99NS
          1  15  0.1569E+01  0.4302E+01  0.1569E+02  0.9546E+02
          3  60  0.4737E+00  0.5796E+01  0.1592E+02  0.7891E+02
          2  60  0.1003E+01  0.3961E+01  0.1837E+02  0.4861E+02
  2   4   4  15  0.2888E+00  0.3579E+01  0.4130E+01  0.8309E+01   0.01    0.5(  3,146)   0.71NS
          1  15  0.1012E+01  0.6675E+01  0.5999E+01  0.1210E+02
          2  60  0.8210E+00  0.4470E+01  0.1960E+02  0.1192E+03
          3  60  0.7488E+00  0.4827E+01  0.1984E+02  0.7861E+02
  2   5   2  24  0.1607E+01  0.4466E+01  0.1488E+02  0.6420E+02   0.00    0.1(  1,148)   0.72NS
          1 126  0.7023E+00  0.4314E+01  0.1715E+02  0.6841E+02
  2   6   4   9  0.1409E+01  0.4796E+01  0.4401E+01  0.6884E+01   0.03    0.6(  8,141)   0.77NS
          1   2************************  0.4450E+01************
          2  11  0.2212E+01  0.3808E+01  0.4889E+01  0.9851E+01
          8  16  0.5690E+00  0.3810E+01  0.5975E+01  0.2452E+02
          9  12  0.1029E+01  0.4658E+01  0.9882E+01  0.5184E+02
          7  20  0.7660E+00  0.7396E+01  0.1045E+02  0.3879E+02
          3  20  0.8051E+00  0.6056E+01  0.1840E+02  0.7891E+02
          5  22  0.9014E+00  0.5205E+01  0.2018E+02  0.1288E+03
          6  38  0.5435E+00  0.3881E+01  0.3107E+02  0.2178E+03
  2   7   2  94  0.9737E+00  0.4159E+01  0.1371E+02  0.4366E+02   0.02    1.4(  2,147)   0.24NS
          3  51  0.5847E+00  0.4302E+01  0.2003E+02  0.9775E+02
          1   5  0.3306E+01  0.8852E+01  0.4153E+02  0.1793E+03
  2   8   1  15  0.5473E+00  0.5784E+01  0.8185E+01  0.2675E+02   0.00    0.3(  1,148)   0.59NS
          2 135  0.9425E+00  0.4302E+01  0.1775E+02  0.8887E+02
  2   9   2  75  0.5904E+00  0.4796E+01  0.1603E+02  0.5473E+02   0.00    0.3(  1,148)   0.60NS
          1  75  0.1110E+01  0.4318E+01  0.1754E+02  0.9103E+02
  2  10   2  75  0.7543E+00  0.4302E+01  0.8546E+01  0.4328E+02   0.00    0.6(  1,148)   0.45NS
          1  75  0.9955E+00  0.4619E+01  0.2503E+02  0.1499E+03
  2  11   1  16  0.2349E+00  0.2204E+01  0.5891E+01  0.2581E+02   0.03    1.7(  3,146)   0.16NS
          4   4************************  0.1027E+02************
          2  80  0.1084E+01  0.4739E+01  0.1691E+02  0.7891E+02
          3  50  0.8602E+00  0.5034E+01  0.2061E+02  0.1033E+03
  2  12   2  45  0.4752E+00  0.4923E+01  0.1401E+02  0.1697E+02   0.03    1.0(  4,145)   0.43NS
          4  22  0.9243E+00  0.5118E+01  0.1559E+02  0.6621E+02
          3  38  0.1145E+01  0.4071E+01  0.1705E+02  0.8010E+02
          1  30  0.9904E+00  0.3855E+01  0.1907E+02  0.1033E+03
          5  15  0.7060E+00  0.6745E+01  0.2165E+02  0.8888E+02
  2  13   1  60  0.1003E+01  0.5267E+01  0.1424E+02  0.6099E+02   0.02    1.4(  2,147)   0.25NS
          2  75  0.7543E+00  0.3484E+01  0.1476E+02  0.4498E+02
          3  15  0.8457E+00  0.5065E+01  0.3714E+02  0.2627E+03
  2  14   2  75  0.5904E+00  0.3056E+01  0.1114E+02  0.5714E+02   0.10   16.0(  1,148)   0.00**
          1  75  0.1263E+01  0.6675E+01  0.2244E+02  0.9013E+02
  2  15   1  60  0.7660E+00  0.4697E+01  0.1070E+02  0.4962E+02   0.00    0.1(  1,148)   0.73NS
          2  90  0.8602E+00  0.4043E+01  0.2085E+02  0.1419E+03
  2  16   2  75  0.7699E+00  0.4318E+01  0.1203E+02  0.5872E+02   0.00    0.1(  1,148)   0.75NS
          1  75  0.8911E+00  0.4326E+01  0.2154E+02  0.1384E+03
  2  17   1  30  0.9336E+00  0.6089E+01  0.1552E+02  0.1033E+03   0.01    0.8(  1,148)   0.36NS
          2 120  0.7881E+00  0.4219E+01  0.1711E+02  0.6099E+02
  3   1   4   3************************  0.4642E+01************   0.01    0.7(  3,146)   0.53NS
          2  74  0.7478E+00  0.3815E+01  0.1058E+02  0.5077E+02
          3  39  0.1050E+01  0.6070E+01  0.2057E+02  0.1213E+03
          1  34  0.5494E+00  0.4578E+01  0.2704E+02  0.1606E+03
3   2     4  15  0.1119E+01  0.3240E+01  0.5671E+01  0.1883E+02    0.03    1.6(  3,146)   0.19NS
          3  51  0.1220E+01  0.3808E+01  0.8975E+01  0.3424E+02
          1  29  0.9115E+00  0.4137E+01  0.9359E+01  0.3835E+02
          2  55  0.5288E+00  0.6578E+01  0.3099E+02  0.1722E+03
3   3     1  14  0.5744E+00  0.3061E+01  0.6888E+01  0.3279E+02    0.03    1.1(  4,145)   0.38NS
          5   7  0.4497E+00  0.3951E+01  0.8488E+01  0.3746E+02
          3  36  0.1392E+01  0.4929E+01  0.1563E+02  0.7652E+02
          4  35  0.7543E+00  0.3484E+01  0.1641E+02  0.5872E+02
          2  58  0.7363E+00  0.6089E+01  0.2113E+02  0.1234E+03
3   4     1  15  0.1484E+01  0.3760E+01  0.4406E+01  0.9212E+01    0.02    0.6(  4,145)   0.70NS
          5   5  0.9696E+00  0.3951E+01  0.7490E+01  0.2337E+02
          3  30  0.1479E+01  0.4421E+01  0.1394E+02  0.5980E+02
          4  24  0.7499E+00  0.6541E+01  0.1502E+02  0.6695E+02
          2  76  0.6552E+00  0.4314E+01  0.2153E+02  0.1278E+03
3   5     1   4************************  0.2778E+01************    0.02    0.7(  4,145)   0.60NS
          3  46  0.8556E+00  0.5926E+01  0.1045E+02  0.4096E+02
          4  50  0.5783E+00  0.4461E+01  0.1448E+02  0.1001E+03
          2  35  0.1146E+01  0.4137E+01  0.2340E+02  0.1691E+03
          5  15  0.1785E+01  0.3959E+01  0.3224E+02  0.2233E+03
3   6     1   4************************  0.5601E+01************    0.00    0.1(  3,146)   0.96NS
          2  47  0.7071E+00  0.4137E+01  0.1198E+02  0.5620E+02
          4  23  0.1258E+01  0.4600E+01  0.1362E+02  0.6048E+02
          3  76  0.6970E+00  0.4802E+01  0.2131E+02  0.1278E+03
3   7     1  18  0.4603E+00  0.2875E+01  0.6957E+01  0.2965E+02    0.02    1.2(  3,146)   0.30NS
          2  62  0.6830E+00  0.5226E+01  0.1506E+02  0.7524E+02
          3  55  0.1356E+01  0.4326E+01  0.1862E+02  0.5036E+02
          4  15  0.1484E+01  0.5065E+01  0.2901E+02  0.1562E+03
3   8     1  25  0.4752E+00  0.3382E+01  0.5538E+01  0.1762E+02    0.05    2.8(  3,146)   0.04 *
          3  52  0.1795E+01  0.5868E+01  0.1783E+02  0.9545E+02
          2  58  0.5979E+00  0.3955E+01  0.1796E+02  0.5423E+02
          4  15  0.1443E+01  0.7200E+01  0.2743E+02  0.1499E+03
3   9     1  12  0.8798E+00  0.3620E+01  0.6463E+01  0.2591E+02    0.01    0.5(  3,146)   0.71NS
          2  27  0.1156E+01  0.4683E+01  0.8753E+01  0.3535E+02
          4  54  0.4954E+00  0.4555E+01  0.1055E+02  0.5068E+02
          3  57  0.1184E+01  0.4318E+01  0.2868E+02  0.1652E+03
3  10     1   7  0.5783E+00  0.3579E+01  0.7695E+01  0.3369E+02    0.01    0.5(  3,146)   0.67NS
          2  49  0.8328E+00  0.4137E+01  0.1090E+02  0.3604E+02
          3  73  0.7504E+00  0.4326E+01  0.1564E+02  0.5915E+02
          4  21  0.1537E+01  0.6556E+01  0.3756E+02  0.2252E+03
3  11     1  75  0.9475E+00  0.4318E+01  0.1392E+02  0.5052E+02    0.00    0.1(  1,148)   0.80NS
          2  75  0.5904E+00  0.4619E+01  0.1966E+02  0.1301E+03
3  12     2  50  0.5783E+00  0.3479E+01  0.8809E+01  0.3502E+02    0.01    0.9(  2,147)   0.40NS
          3  50  0.9904E+00  0.5257E+01  0.1939E+02  0.5980E+02
          1  50  0.1350E+01  0.4929E+01  0.2217E+02  0.1419E+03
3  13     4  37  0.7218E+00  0.3735E+01  0.8758E+01  0.3778E+02    0.01    0.3(  3,146)   0.79NS
          1  38  0.6285E+00  0.4226E+01  0.1163E+02  0.4484E+02
          2  37  0.6250E+00  0.5065E+01  0.2218E+02  0.8534E+02
          3  38  0.1398E+01  0.5337E+01  0.2452E+02  0.1482E+03
3  14     4  30  0.9336E+00  0.4107E+01  0.1252E+02  0.5980E+02    0.00    0.1(  4,145)   0.98NS
          3  30  0.5783E+00  0.4611E+01  0.1253E+02  0.4429E+02
          5  30  0.4497E+00  0.3642E+01  0.1694E+02  0.1001E+03
          2  30  0.1350E+01  0.4870E+01  0.2090E+02  0.1526E+03
          1  30  0.8602E+00  0.3961E+01  0.2106E+02  0.1033E+03
4   1     3  19  0.9567E+00  0.4326E+01  0.6464E+01  0.1905E+02    0.04    0.9(  7,142)   0.50NS
          6  19  0.6624E+00  0.2896E+01  0.7750E+01  0.4515E+02
          4  19  0.9307E+00  0.7549E+01  0.9060E+01  0.3029E+02
          1  19  0.7238E+00  0.3735E+01  0.1247E+02  0.4979E+02
          2  18  0.4580E+00  0.5005E+01  0.1505E+02  0.8276E+02
          5  19  0.1682E+01  0.5784E+01  0.2232E+02  0.9620E+02
          8  19  0.1148E+01  0.4683E+01  0.2516E+02  0.1775E+03
          7  18  0.3459E+00  0.5295E+01  0.3701E+02  0.2734E+03
NS=NOT SIGNIFICANT, *=SIGNIFICANT (P<.05), **=SIGNIFICANT (P<.01)
```

```
CONSEQUENCE MEASURE:  POP. DOSE 50 MI.
0     ISSUE GROUP =  1   ISSUE =  1   SLC FAILURE TO ACTUATE

      LEVEL 1 NO.<MED.= 11 NO. EXP.=  7     NO.>=MED.=  4 NO. EXP.=  8    CHI-SQ.=   4.3 DF= 1 SIG.= 0.038
      LEVEL 2 NO.<MED.= 26 NO. EXP.= 30     NO.>=MED.= 34 NO. EXP.= 30    CHI-SQ.=   1.1 DF= 1 SIG.= 0.302
      LEVEL 3 NO.<MED.= 31 NO. EXP.= 30     NO.>=MED.= 29 NO. EXP.= 30    CHI-SQ.=   0.1 DF= 1 SIG.= 0.796
      LEVEL 4 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8    CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
      OVERALL CHI-SQ=   5.7 DF=  7  SIG.= 0.577

0     ISSUE GROUP =  1   ISSUE =  2   DC COMMON MODE

      LEVEL 1 NO.<MED.= 11 NO. EXP.=  7     NO.>=MED.=  4 NO. EXP.=  8    CHI-SQ.=   4.3 DF= 1 SIG.= 0.038
      LEVEL 2 NO.<MED.= 47 NO. EXP.= 30     NO.>=MED.= 13 NO. EXP.= 30    CHI-SQ.=  19.3 DF= 1 SIG.= 0.000
      LEVEL 3 NO.<MED.= 16 NO. EXP.= 30     NO.>=MED.= 44 NO. EXP.= 30    CHI-SQ.=  13.1 DF= 1 SIG.= 0.000
      LEVEL 4 NO.<MED.=  0 NO. EXP.=  7     NO.>=MED.= 15 NO. EXP.=  8    CHI-SQ.=  13.1 DF= 1 SIG.= 0.000
      OVERALL CHI-SQ=  49.7 DF=  7  SIG.= 0.000

0     ISSUE GROUP =  1   ISSUE =  3   FAILURE TO VENT

      LEVEL 1 NO.<MED.= 10 NO. EXP.=  7     NO.>=MED.=  5 NO. EXP.=  8    CHI-SQ.=   2.4 DF= 1 SIG.= 0.120
      LEVEL 2 NO.<MED.= 31 NO. EXP.= 30     NO.>=MED.= 29 NO. EXP.= 30    CHI-SQ.=   0.1 DF= 1 SIG.= 0.796
      LEVEL 3 NO.<MED.= 29 NO. EXP.= 30     NO.>=MED.= 31 NO. EXP.= 30    CHI-SQ.=   0.1 DF= 1 SIG.= 0.796
      LEVEL 4 NO.<MED.=  4 NO. EXP.=  7     NO.>=MED.= 11 NO. EXP.=  8    CHI-SQ.=   2.4 DF= 1 SIG.= 0.120
      OVERALL CHI-SQ=   5.0 DF=  7  SIG.= 0.666

0     ISSUE GROUP =  1   ISSUE =  4   SW MOD A VS. MOD B

      LEVEL 1 NO.<MED.= 43 NO. EXP.= 44     NO.>=MED.= 45 NO. EXP.= 44    CHI-SQ.=   0.0 DF= 1 SIG.= 0.831
      LEVEL 2 NO.<MED.= 31 NO. EXP.= 31     NO.>=MED.= 31 NO. EXP.= 31    CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
      OVERALL CHI-SQ=   0.0 DF=  3  SIG.= 0.997

0     ISSUE GROUP =  1   ISSUE =  5   POWER RECOVERY

      LEVEL 1 NO.<MED.= 13 NO. EXP.=  7     NO.>=MED.=  2 NO. EXP.=  8    CHI-SQ.=   9.6 DF= 1 SIG.= 0.002
      LEVEL 2 NO.<MED.= 32 NO. EXP.= 30     NO.>=MED.= 28 NO. EXP.= 30    CHI-SQ.=   0.3 DF= 1 SIG.= 0.606
      LEVEL 3 NO.<MED.= 25 NO. EXP.= 30     NO.>=MED.= 35 NO. EXP.= 30    CHI-SQ.=   1.7 DF= 1 SIG.= 0.197
      LEVEL 4 NO.<MED.=  4 NO. EXP.=  7     NO.>=MED.= 11 NO. EXP.=  8    CHI-SQ.=   2.4 DF= 1 SIG.= 0.120
      OVERALL CHI-SQ=  14.0 DF=  7  SIG.= 0.051

0     ISSUE GROUP =  2   ISSUE =  1   PROB. OF STUCK OPEN VAC. BRKR.

      LEVEL 1 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8    CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
      LEVEL 2 NO.<MED.= 29 NO. EXP.= 30     NO.>=MED.= 31 NO. EXP.= 30    CHI-SQ.=   0.1 DF= 1 SIG.= 0.796
      LEVEL 3 NO.<MED.= 29 NO. EXP.= 30     NO.>=MED.= 31 NO. EXP.= 30    CHI-SQ.=   0.1 DF= 1 SIG.= 0.796
      LEVEL 4 NO.<MED.= 10 NO. EXP.=  7     NO.>=MED.=  5 NO. EXP.=  8    CHI-SQ.=   2.4 DF= 1 SIG.= 0.120
      OVERALL CHI-SQ=   2.8 DF=  7  SIG.= 0.902

0     ISSUE GROUP =  2   ISSUE =  2   HPSW-SPRAY

      LEVEL 1 NO.<MED.=  8 NO. EXP.=  7     NO.>=MED.=  7 NO. EXP.=  8    CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
```

BEST COPY AVAILABLE

```
     LEVEL 2 NO.<MED.= 23 NO. EXP.= 30     NO.>=MED.= 37 NO. EXP.= 30   CHI-SQ.=   3.3 DF= 1 SIG.= 0.071
     LEVEL 3 NO.<MED.= 37 NO. EXP.= 30     NO.>=MED.= 23 NO. EXP.= 30   CHI-SQ.=   3.3 DF= 1 SIG.= 0.071
     LEVEL 4 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
     OVERALL CHI-SQ=   7.1 DF=  7  SIG.= 0.422

0    ISSUE GROUP =   2   ISSUE =   3   VENT-SBO-NACR

     LEVEL 1 NO.<MED.=  8 NO. EXP.=  7     NO.>=MED.=  7 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
     LEVEL 2 NO.<MED.= 31 NO. EXP.= 30     NO.>=MED.= 29 NO. EXP.= 30   CHI-SQ.=   0.1 DF= 1 SIG.= 0.796
     LEVEL 3 NO.<MED.= 27 NO. EXP.= 30     NO.>=MED.= 33 NO. EXP.= 30   CHI-SQ.=   0.6 DF= 1 SIG.= 0.439
     LEVEL 4 NO.<MED.=  8 NO. EXP.=  7     NO.>=MED.=  7 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
     OVERALL CHI-SQ=   1.2 DF=  7  SIG.= 0.991

0    ISSUE GROUP =   2   ISSUE =   4   VENT-SBO-ACR

     LEVEL 1 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 2 NO.<MED.= 28 NO. EXP.= 30     NO.>=MED.= 32 NO. EXP.= 30   CHI-SQ.=   0.3 DF= 1 SIG.= 0.606
     LEVEL 3 NO.<MED.= 29 NO. EXP.= 30     NO.>=MED.= 31 NO. EXP.= 30   CHI-SQ.=   0.1 DF= 1 SIG.= 0.796
     LEVEL 4 NO.<MED.= 10 NO. EXP.=  7     NO.>=MED.=  5 NO. EXP.=  8   CHI-SQ.=   2.4 DF= 1 SIG.= 0.120
     OVERALL CHI-SQ=   2.7 DF=  7  SIG.= 0.908

0    ISSUE GROUP =   2   ISSUE =   5   SP BYPASS, SMALL/LARGE

     LEVEL 1 NO.<MED.= 63 NO. EXP.= 63     NO.>=MED.= 63 NO. EXP.= 63   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 2 NO.<MED.= 11 NO. EXP.= 12     NO.>=MED.= 13 NO. EXP.= 12   CHI-SQ.=   0.2 DF= 1 SIG.= 0.683
     OVERALL CHI-SQ=   0.2 DF=  3  SIG.= 0.983

0    ISSUE GROUP =   2   ISSUE =   6   CONT FAILURE PRESS. (T<500F B VB)

     LEVEL 1 NO.<MED.=  1 NO. EXP.=  1     NO.>=MED.=  1 NO. EXP.=  1   TEST CANNOT BE RUN; EXP. NO. < 3
     LEVEL 2 NO.<MED.=  7 NO. EXP.=  5     NO.>=MED.=  4 NO. EXP.=  6   CHI-SQ.=   1.5 DF= 1 SIG.= 0.226
     LEVEL 3 NO.<MED.=  8 NO. EXP.= 10     NO.>=MED.= 12 NO. EXP.= 10   CHI-SQ.=   0.8 DF= 1 SIG.= 0.371
     LEVEL 4 NO.<MED.=  3 NO. EXP.=  4     NO.>=MED.=  6 NO. EXP.=  5   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 5 NO.<MED.=  9 NO. EXP.= 11     NO.>=MED.= 13 NO. EXP.= 11   CHI-SQ.=   0.7 DF= 1 SIG.= 0.394
     LEVEL 6 NO.<MED.= 21 NO. EXP.= 19     NO.>=MED.= 17 NO. EXP.= 19   CHI-SQ.=   0.4 DF= 1 SIG.= 0.516
     LEVEL 7 NO.<MED.=  9 NO. EXP.= 10     NO.>=MED.= 11 NO. EXP.= 10   CHI-SQ.=   0.2 DF= 1 SIG.= 0.655
     LEVEL 8 NO.<MED.= 10 NO. EXP.=  8     NO.>=MED.=  6 NO. EXP.=  8   CHI-SQ.=   1.0 DF= 1 SIG.= 0.317
     LEVEL 9 NO.<MED.=  6 NO. EXP.=  6     NO.>=MED.=  6 NO. EXP.=  6   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   4.6 DF= 15  SIG.= 0.995

0    ISSUE GROUP =   2   ISSUE =   7   LATE FAILURE LOCATION (800-1200 A VB)

     LEVEL 1 NO.<MED.=  1 NO. EXP.=  2     NO.>=MED.=  4 NO. EXP.=  3   TEST CANNOT BE RUN; EXP. NO. < 3
     LEVEL 2 NO.<MED.= 47 NO. EXP.= 47     NO.>=MED.= 47 NO. EXP.= 47   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 3 NO.<MED.= 26 NO. EXP.= 25     NO.>=MED.= 25 NO. EXP.= 26   CHI-SQ.=   0.1 DF= 1 SIG.= 0.779
     OVERALL CHI-SQ=   0.1 DF=  3  SIG.= 0.994

0    ISSUE GROUP =   2   ISSUE =   8   CONT FAILURE SIZE, RAPID PRESS.
```

```
    LEVEL 1 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
    LEVEL 2 NO.<MED.= 68 NO. EXP.= 67     NO.>=MED.= 67 NO. EXP.= 68   CHI-SQ.=   0.0 DF= 1 SIG.= 0.863
    OVERALL CHI-SQ=   0.3 DF=  3  SIG.= 0.961

0   ISSUE GROUP =   2   ISSUE =   9   CONT FAILURE SIZE, SLOW PRESS.

    LEVEL 1 NC.<MED.= 37 NO. EXP.= 37     NO.>=MED.= 38 NO. EXP.= 38   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
    LEVEL 2 NO.<MED.= 37 NO. EXP.= 37     NO.>=MED.= 38 NO. EXP.= 38   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
    OVERALL CHI-SQ=   0.0 DF=  3  SIG.= 1.000

0   ISSUE GROUP =   2   ISSUE =  10   VB MODE, HIGH-P FLOW MELT

    LEVEL 1 NO.<MED.= 36 NO. EXP.= 37     NO.>=MED.= 39 NO. EXP.= 38   CHI-SQ.=   0.1 DF= 1 SIG.= 0.817
    LEVEL 2 NO.<MED.= 38 NO. EXP.= 37     NO.>=MED.= 37 NO. EXP.= 38   CHI-SQ.=   0.1 DF= 1 SIG.= 0.817
    OVERALL CHI-SQ=   0.1 DF=  3  SIG.= 0.991

0   ISSUE GROUP =   2   ISSUE =  11   CONT PRESS. BEFORE VB, LONG TERM TB

    LEVEL 1 NO.<MED.= 11 NO. EXP.=  8     NO.>=MED.=  5 NO. EXP.=  8   CHI-SQ.=   2.3 DF= 1 SIG.= 0.134
    LEVEL 2 NO.<MED.= 35 NO. EXP.= 40     NO.>=MED.= 45 NO. EXP.= 40   CHI-SQ.=   1.3 DF= 1 SIG.= 0.264
    LEVEL 3 NO.<MED.= 25 NO. EXP.= 25     NO.>=MED.= 25 NO. EXP.= 25   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
    LEVEL 4 NO.<MED.=  3 NO. EXP.=  2     NO.>=MED.=  1 NO. EXP.=  2   TEST CANNOT BE RUN; EXP. NO. < 3
    OVERALL CHI-SQ=   3.5 DF=  5  SIG.= 0.623

0   ISSUE GROUP =   2   ISSUE =  12   PRESSURE RISE AT VB

    LEVEL 1 NO.<MED.= 16 NO. EXP.= 15     NO.>=MED.= 14 NO. EXP.= 15   CHI-SQ.=   0.1 DF= 1 SIG.= 0.715
    LEVEL 2 NO.<MED.= 22 NO. EXP.= 22     NO.>=MED.= 23 NO. EXP.= 23   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
    LEVEL 3 NO.<MED.= 21 NO. EXP.= 19     NO.>=MED.= 17 NO. EXP.= 19   CHI-SQ.=   0.4 DF= 1 SIG.= 0.516
    LEVEL 4 NO.<MED.= 10 NO. EXP.= 11     NO.>=MED.= 12 NO. EXP.= 11   CHI-SQ.=   0.2 DF= 1 SIG.= 0.670
    LEVEL 5 NO.<MED.=  5 NO. EXP.=  7     NO.>=MED.= 10 NO. EXP.=  8   CHI-SQ.=   1.1 DF= 1 SIG.= 0.301
    OVERALL CHI-SQ=   1.8 DF=  9  SIG.= 0.994

0   ISSUE GROUP =   2   ISSUE =  13   DELTA P DUE TO SUMP WATER INTERACT.

    LEVEL 1 NO.<MED.= 25 NO. EXP.= 30     NO.>=MED.= 35 NO. EXP.= 30   CHI-SQ.=   1.7 DF= 1 SIG.= 0.197
    LEVEL 2 NO.<MED.= 42 WO. EXP.= 37     NO.>=MED.= 33 NO. EXP.= 38   CHI-SQ.=   1.3 DF= 1 SIG.= 0.248
    LEVEL 3 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
    OVERALL CHI-SQ=   3.0 DF=  5  SIG.= 0.700

0   ISSUE GROUP =   2   ISSUE =  14   PROB OF DRY DW MELT THROUGH

    LEVEL 1 NO.<MED.= 26 NO. EXP.= 37     NO.>=MED.= 49 NO. EXP.= 38   CHI-SQ.=   6.5 DF= 1 SIG.= 0.011
    LEVEL 2 NO.<MED.= 48 NO. EXP.= 37     NO.>=MED.= 27 NO. EXP.= 38   CHI-SQ.=   6.5 DF= 1 SIG.= 0.011
    OVERALL CHI-SQ=  12.9 DF=  3  SIG.= 0.005

0   ISSUE GROUP =   2   ISSUE =  15   PROB OF WET DW MELT THROUGH

    LEVEL 1 NO.<MED.= 28 NO. EXP.= 30     NO.>=MED.= 32 NO. EXP.= 30   CHI-SQ.=   0.3 DF= 1 SIG.= 0.606
    LEVEL 2 NO.<MED.= 46 NO. EXP.= 45     NO.>=MED.= 44 NO. EXP.= 45   CHI-SQ.=   0.0 DF= 1 SIG.= 0.833
    OVERALL CHI-SQ=   0.3 DF=  3  SIG.= 0.958

0   ISSUE GROUP =   2   ISSUE =  16   PROB OF DW M-THRU W/HI-P MELT EJECT

    LEVEL 1 NO.<MED.= 37 NO. EXP.= 37     NO.>=MED.= 38 NO. EXP.= 38   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
    LEVEL 2 NO.<MED.= 37 NO. EXP.= 37     NO.>=MED.= 38 NO. EXP.= 38   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
    OVERALL CHI-SQ=   0.0 DF=  3  SIG.= 1.000

0   ISSUE GROUP =   2   ISSUE =  17   PROB OF H2 BURNS IN RB LEADING TO BP

    LEVEL 1 NO.<MED.= 13 NO. EXP.= 15     NO.>=MED.= 17 NO. EXP.= 15   CHI-SQ.=   0.5 DF= 1 SIG.= 0.465
    LEVEL 2 NO.<MED.= 61 NO. EXP.= 60     NO.>=MED.= 59 NO. EXP.= 60   CHI-SQ.=   0.0 DF= 1 SIG.= 0.855
    OVERALL CHI-SQ=   0.6 DF=  3  SIG.= 0.904

0   ISSUE GROUP =   3   ISSUE =   1   IN-VES RELEASE FROM FUEL

    LEVEL 1 NO.<MED.= 17 NO. EXP.= 17     NO.>=MED.= 17 NO. EXP.= 17   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
    LEVEL 2 NO.<MED.= 41 NO. EXP.= 37     NO.>=MED.= 33 NO. EXP.= 37   CHI-SQ.=   0.9 DF= 1 SIG.= 0.352
    LEVEL 3 NO.<MED.= 14 NO. EXP.= 19     NO.>=MED.= 25 NO. EXP.= 20   CHI-SQ.=   2.6 DF= 1 SIG.= 0.109
    LEVEL 4 NO.<MED.=  2 NO. EXP.=  1     NO.>=MED.=  1 NO. EXP.=  2   TEST CANNOT BE RUN; EXP. NO. < 3
    OVERALL CHI-SQ=   3.4 DF=  5  SIG.= 0.634

0   ISSUE GROUP =   3   ISSUE =   2   CSI DECOMP

    LEVEL 1 NO.<MED.= 15 NO. EXP.= 14     NO.>=MED.= 14 NO. EXP.= 15   CHI-SQ.=   0.1 DF= 1 SIG.= 0.710
    LEVEL 2 NO.<MED.= 21 NO. EXP.= 27     NO.>=MED.= 34 NO. EXP.= 28   CHI-SQ.=   2.6 DF= 1 SIG.= 0.106
    LEVEL 3 NO.<MED.= 29 NO. EXP.= 25     NO.>=MED.= 22 NO. EXP.= 26   CHI-SQ.=   1.3 DF= 1 SIG.= 0.263
    LEVEL 4 NO.<MED.=  9 NO. EXP.=  7     NO.>=MED.=  6 NO. EXP.=  8   CHI-SQ.=   1.1 DF= 1 SIG.= 0.301
    OVERALL CHI-SQ=   5.1 DF=  7  SIG.= 0.650

0   ISSUE GROUP =   3   ISSUE =   3   FRAC IN-VES RETENTION LEAKED, AT VB

    LEVEL 1 NO.<MED.=  8 NO. EXP.=  7     NO.>=MED.=  6 NO. EXP.=  7   CHI-SQ.=   0.3 DF= 1 SIG.= 0.593
    LEVEL 2 NO.<MED.= 22 NO. EXP.= 29     NO.>=MED.= 36 NO. EXP.= 29   CHI-SQ.=   3.4 DF= 1 SIG.= 0.066
    LEVEL 3 NO.<MED.= 16 NO. EXP.= 18     NO.>=MED.= 20 NO. EXP.= 18   CHI-SQ.=   0.4 DF= 1 SIG.= 0.505
    LEVEL 4 NO.<MED.= 24 NO. EXP.= 17     NO.>=MED.= 11 NO. EXP.= 18   CHI-SQ.=   5.6 DF= 1 SIG.= 0.018
    LEVEL 5 NO.<MED.=  4 NO. EXP.=  3     NO.>=MED.=  3 NO. EXP.=  4   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
    OVERALL CHI-SQ=   9.7 DF=  9  SIG.= 0.374

0   ISSUE GROUP =   3   ISSUE =   4   S POOL DF

    LEVEL 1 NO.<MED.=  9 NO. EXP.=  7     NO.>=MED.=  6 NO. EXP.=  8   CHI-SQ.=   1.1 DF= 1 SIG.= 0.301
    LEVEL 2 NO.<MED.= 38 NO. EXP.= 38     NO.>=MED.= 38 NO. EXP.= 38   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
    LEVEL 3 NO.<MED.= 15 NO. EXP.= 15     NO.>=MED.= 15 NO. EXP.= 15   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
    LEVEL 4 NO.<MED.=  9 NO. EXP.= 12     NO.>=MED.= 15 NO. EXP.= 12   CHI-SQ.=   1.5 DF= 1 SIG.= 0.221
    LEVEL 5 NO.<MED.=  3 NO. EXP.=  2     NO.>=MED.=  2 NO. EXP.=  3   TEST CANNOT BE RUN; EXP. NO. < 3
    OVERALL CHI-SQ=   2.6 DF=  7  SIG.= 0.922

0   ISSUE GROUP =   3   ISSUE =   5   S POOL DF, VOL I
```

```
      LEVEL 1 NO.<MED.=  3 NO. EXP.=  2     NO.>=MED.=  1 NO. EXP.=  2   TEST CANNOT BE RUN; EXP. NO. < 3
      LEVEL 2 NO.<MED.= 18 NO. EXP.= 17     NO.>=MED.= 17 NO. EXP.= 18   CHI-SQ.=   0.1 DF= 1 SIG.= 0.735
      LEVEL 3 NO.<MED.= 20 NO. EXP.= 23     NO.>=MED.= 26 NO. EXP.= 23   CHI-SQ.=   0.8 DF= 1 SIG.= 0.376
      LEVEL 4 NO.<MED.= 24 NO. EXP.= 25     NO.>=MED.= 26 NO. EXP.= 25   CHI-SQ.=   0.1 DF= 1 SIG.= 0.777
      LEVEL 5 NO.<MED.=  9 NO. EXP.=  7     NO.>=MED.=  6 NO. EXP.=  8   CHI-SQ.=   1.1 DF= 1 SIG.= 0.301
      OVERALL CHI-SQ=   2.0 DF=  7  SIG.= 0.957

0     ISSUE GROUP =   3   ISSUE =   6   REVOL FROM RPV (FRVOL)

      LEVEL 1 NO.<MED.=  3 NO. EXP.=  2     NO.>=MED.=  1 NO. EXP.=  2   TEST CANNOT BE RUN; EXP. NO. < 3
      LEVEL 2 NO.<MED.= 24 NO. EXP.= 23     NO.>=MED.= 23 NO. EXP.= 24   CHI-SQ.=   0.1 DF= 1 SIG.= 0.770
      LEVEL 3 NO.<MED.= 36 NO. EXP.= 38     NO.>=MED.= 40 NO. EXP.= 38   CHI-SQ.=   0.2 DF= 1 SIG.= 0.646
      LEVEL 4 NO.<MED.= 11 NO. EXP.= 11     NO.>=MED.= 12 NO. EXP.= 12   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
      OVERALL CHI-SQ=   0.3 DF=  5  SIG.= 0.998

0     ISSUE GROUP =   3   ISSUE =   7   CCI REL

      LEVEL 1 NO.<MED.= 12 NO. EXP.=  9     NO.>=MED.=  6 NO. EXP.=  9   CHI-SQ.=   2.0 DF= 1 SIG.= 0.157
      LEVEL 2 NO.<MED.= 30 NO. EXP.= 31     NO.>=MED.= 32 NO. EXP.= 31   CHI-SQ.=   0.1 DF= 1 SIG.= 0.799
      LEVEL 3 NO.<MED.= 26 NO. EXP.= 27     NO.>=MED.= 29 NO. EXP.= 28   CHI-SQ.=   0.1 DF= 1 SIG.= 0.787
      LEVEL 4 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
      OVERALL CHI-SQ=   2.4 DF=  7  SIG.= 0.934

0     ISSUE GROUP =   3   ISSUE =   8   RB DF

      LEVEL 1 NO.<MED.= 15 NO. EXP.= 12     NO.>=MED.= 10 NO. EXP.= 13   CHI-SQ.=   1.4 DF= 1 SIG.= 0.230
      LEVEL 2 NO.<MED.= 31 NO. EXP.= 29     NO.>=MED.= 27 NO. EXP.= 29   CHI-SQ.=   0.3 DF= 1 SIG.= 0.599
      LEVEL 3 NO.<MED.= 21 NO. EXP.= 26     NO.>=MED.= 31 NO. EXP.= 26   CHI-SQ.=   1.9 DF= 1 SIG.= 0.166
      LEVEL 4 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
      OVERALL CHI-SQ=   3.6 DF=  7  SIG.= 0.820

0     ISSUE GROUP =   3   ISSUE =   9   REF BAY DF

      LEVEL 1 NO.<MED.=  7 NO. EXP.=  6     NO.>=MED.=  5 NO. EXP.=  6   CHI-SQ.=   0.3 DF= 1 SIG.= 0.564
      LEVEL 2 NO.<MED.= 13 NO. EXP.= 13     NO.>=MED.= 14 NO. EXP.= 14   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
      LEVEL 3 NO.<MED.= 28 NO. EXP.= 28     NO.>=MED.= 29 NO. EXP.= 29   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
      LEVEL 4 NO.<MED.= 26 NO. EXP.= 27     NO.>=MED.= 28 NO. EXP.= 27   CHI-SQ.=   0.1 DF= 1 SIG.= 0.785
      OVERALL CHI-SQ=   0.4 DF=  7  SIG.= 1.000

0     ISSUE GROUP =   3   ISSUE =  10   LATE RELEASE FRACT, IODINE

      LEVEL 1 NO.<MED.=  4 NO. EXP.=  3     NO.>=MED.=  3 NO. EXP.=  4   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
      LEVEL 2 NO.<MED.= 25 NO. EXP.= 24     NO.>=MED.= 24 NO. EXP.= 25   CHI-SQ.=   0.1 DF= 1 SIG.= 0.775
      LEVEL 3 NO.<MED.= 36 NO. EXP.= 36     NO.>=MED.= 37 NO. EXP.= 37   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
      LEVEL 4 NO.<MED.=  9 NO. EXP.= 10     NO.>=MED.= 12 NO. EXP.= 11   CHI-SQ.=   0.2 DF= 1 SIG.= 0.662
      OVERALL CHI-SQ=   0.3 DF=  7  SIG.= 1.000
```

CONSEQUENCE MEASURE:
PROPERTY DAMAGE

BASE CASE :
PEACH BOTTOM LLH (CRAC2)

ISSUE LEVELS FOR EACH SAMPLE MEMBER, IN ORDER OF INCREASING RISK

RISK	ISSUE LEVELS, FOR ALL ISSUES																															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
4.346E+00	2	2	2	1	1	2	3	3	4	1	6	3	2	2	2	1	2	1	2	2	2	2	2	2	2	2	4	3	3	2	2	2
6.971E+00	2	2	3	1	1	3	2	3	2	1	6	2	2	2	1	3	5	2	1	1	1	2	2	3	5	4	3	3	1	2	4	2
1.256E+01	2	1	2	2	1	4	1	3	3	1	3	3	1	2	2	2	2	2	2	1	2	2	1	2	2	3	4	3	2	1	4	3
1.463E+01	3	2	2	1	3	3	3	2	3	1	5	3	2	2	2	1	2	3	2	2	2	2	2	1	4	2	4	3	2	2	4	1
1.661E+01	3	2	3	2	3	2	4	3	1	1	8	3	1	2	2	3	4	2	2	2	1	2	2	2	4	2	2	2	2	2	1	2
1.828E+01	3	1	3	2	4	2	1	3	3	1	7	3	2	2	2	1	3	1	2	1	1	2	2	2	2	2	3	4	2	2	3	2
2.241E+01	3	3	3	1	1	1	2	2	3	1	4	3	2	1	2	2	2	2	2	1	2	2	3	1	2	2	2	3	1	2	4	3
2.467E+01	2	3	1	1	3	3	3	4	3	2	5	2	2	1	2	3	3	2	1	2	2	2	3	2	4	2	3	3	2	1	3	2
2.553E+01	3	2	1	1	2	2	3	2	1	1	1	3	2	1	1	1	2	1	1	2	1	2	2	4	3	4	4	3	2	1	3	3
2.683E+01	3	2	3	2	1	2	3	2	2	1	7	2	2	2	1	3	1	2	2	1	1	1	3	3	2	2	1	2	2	2	4	3
2.866E+01	2	2	2	2	2	2	3	3	3	1	8	2	2	1	1	2	2	1	2	2	1	2	1	2	1	2	3	2	1	1	4	3
3.272E+01	3	3	2	1	1	2	3	3	2	1	6	2	2	1	2	2	2	2	2	2	2	2	2	4	3	2	4	4	1	1	1	2
3.432E+01	3	3	1	1	1	2	3	4	3	1	6	2	2	2	2	2	1	2	2	2	2	2	2	3	4	2	3	2	3	2	2	3
3.434E+01	3	3	2	2	3	3	3	1	1	1	9	3	2	1	1	1	3	2	2	1	2	2	1	3	2	3	4	2	2	1	2	1
4.057E+01	4	2	3	2	2	3	3	1	2	2	7	2	2	2	1	2	1	2	2	2	1	2	2	3	3	3	2	3	3	1	4	3
4.084E+01	2	2	2	1	4	2	2	3	2	1	7	3	2	1	2	1	1	2	2	2	1	2	2	3	4	2	3	3	3	2	4	4
4.440E+01	2	2	2	1	2	2	2	3	3	1	9	2	2	2	1	2	4	2	2	2	2	2	1	2	4	5	4	2	2	2	4	3
4.978E+01	2	2	2	2	2	2	2	2	3	1	6	2	2	1	1	1	1	1	2	2	1	2	2	1	2	4	2	3	3	2	1	3
4.989E+01	1	3	3	1	2	3	2	1	3	1	6	2	2	2	2	3	5	3	2	1	1	2	2	4	4	3	4	3	3	1	1	3
5.490E+01	2	3	3	1	3	2	2	3	4	2	8	2	2	1	2	3	2	1	2	1	1	2	2	2	2	4	4	2	2	2	4	2
5.610E+01	1	3	2	1	3	3	4	2	3	1	3	3	2	1	2	2	2	3	2	2	2	2	2	1	2	2	3	2	1	3	3	2
5.885E+01	1	3	3	2	1	3	2	2	3	2	3	2	2	1	2	3	3	1	1	1	2	2	2	4	4	2	2	3	3	1	3	2
6.430E+01	3	2	1	1	3	1	1	3	4	1	9	2	2	2	2	2	4	2	2	2	1	2	2	2	2	4	2	3	2	3	3	2
7.182E+01	3	3	2	1	2	2	2	3	2	1	6	2	2	1	2	2	1	1	2	1	2	2	1	2	2	2	3	3	2	3	3	2
7.531E+01	2	2	2	1	2	4	3	3	2	1	8	2	2	2	2	3	2	1	2	2	1	2	3	1	3	2	4	4	3	1	3	4
8.104E+01	4	3	3	2	2	3	3	1	2	1	4	2	1	1	2	2	5	1	2	2	1	2	3	2	2	2	4	2	3	2	4	3
8.140E+01	2	2	3	2	2	3	3	4	4	1	6	2	2	2	1	1	2	2	2	2	2	2	2	3	2	2	3	3	3	1	3	4
8.820E+01	2	2	3	2	3	4	2	3	3	1	6	2	2	1	2	4	1	2	2	2	1	1	2	4	2	2	3	2	1	2	3	2
9.359E+01	3	3	1	1	2	3	4	3	3	1	3	3	2	2	1	2	2	1	1	2	1	2	2	2	2	2	2	3	3	1	4	3
9.712E+01	3	2	3	1	1	3	3	4	2	1	5	3	2	1	1	2	3	2	1	2	1	2	3	3	1	2	3	3	1	3	4	3
1.011E+02	3	1	2	2	1	2	1	2	1	1	8	3	2	1	2	3	4	2	2	2	1	2	3	2	3	1	2	2	4	4	4	3
1.033E+02	2	3	2	2	3	2	2	2	2	1	4	1	2	2	2	1	3	2	2	1	1	2	2	1	4	2	2	3	2	2	3	4
1.074E+02	2	2	4	1	4	2	3	3	3	1	6	2	2	2	1	3	2	2	2	2	1	2	1	1	2	2	2	3	2	1	4	3
1.107E+02	4	3	3	1	2	3	3	3	2	1	6	2	2	1	2	2	2	1	2	1	2	2	2	3	3	4	2	3	3	2	2	3
1.134E+02	3	2	2	1	1	1	3	2	2	1	5	2	2	2	1	3	4	2	1	2	1	2	2	2	3	3	5	2	2	2	4	4
1.156E+02	3	2	3	1	3	4	3	2	2	2	8	2	2	1	2	2	2	1	2	1	2	2	1	3	5	3	2	3	1	3	3	4
1.158E+02	2	2	2	2	2	1	3	3	2	1	6	3	2	2	2	2	2	2	1	2	2	2	2	2	4	2	4	2	2	2	3	3
1.210E+02	2	3	3	2	2	2	2	2	2	1	2	3	2	1	2	3	2	2	2	2	2	2	2	2	5	2	2	3	4	2	2	3
1.222E+02	4	3	3	1	3	2	3	1	3	2	6	3	2	2	2	3	3	1	2	2	2	2	1	1	3	2	2	2	3	2	2	2
1.300E+02	3	3	2	1	3	3	1	1	4	1	5	3	2	1	2	2	3	1	2	2	2	2	2	3	1	2	4	3	3	1	2	3
1.319E+02	3	2	2	1	3	2	3	3	4	1	7	2	1	1	1	2	3	2	2	2	2	2	3	3	4	4	2	3	3	3	3	1
1.708E+02	3	2	1	2	3	2	3	2	3	1	2	3	1	1	2	3	3	1	2	2	2	2	2	3	1	2	2	3	2	3	3	3
1.758E+02	3	2	3	2	3	2	3	4	2	1	8	2	2	2	1	2	3	1	2	1	1	2	1	3	4	2	5	3	3	2	3	3
1.806E+02	3	3	1	2	2	3	2	2	1	1	6	1	1	1	1	4	3	2	2	2	2	2	2	1	3	1	4	2	1	3	4	2
1.820E+02	3	1	2	1	2	3	2	2	2	2	5	2	2	1	2	2	3	2	2	1	2	2	3	2	2	4	3	3	3	3	3	4
1.824E+02	3	1	2	1	2	3	1	4	2	1	2	2	2	1	1	2	3	2	2	1	2	1	2	1	2	2	3	2	2	2	2	4
1.891E+02	2	3	3	1	1	3	2	3	3	2	7	2	2	2	1	2	2	2	2	2	1	2	2	3	4	1	3	3	2	3	4	3
1.902E+02	2	1	3	2	2	4	3	2	2	1	7	2	2	1	2	1	3	1	1	1	2	1	3	1	2	4	1	2	2	2	4	3
1.942E+02	2	1	3	2	2	1	2	3	4	1	5	2	2	2	1	2	2	3	1	2	2	2	2	3	1	2	3	3	4	2	4	2
1.984E+02	3	3	2	1	2	1	2	3	3	1	2	2	2	2	2	2	3	2	2	1	1	2	1	2	3	3	4	3	2	4	4	3
1.994E+02	1	1	3	2	2	3	4	2	2	1	2	2	2	2	2	1	3	2	1	2	1	1	2	2	3	3	3	2	2	3	2	3
2.015E+02	3	3	4	2	2	3	2	3	2	1	7	2	1	1	1	2	1	2	2	1	1	2	2	4	3	2	2	1	2	3	2	3
2.018E+02	1	1	3	1	2	3	4	2	2	1	3	3	2	1	2	2	2	1	1	2	1	2	2	1	2	2	2	2	3	3	3	3
2.040E+02	1	2	2	1	2	2	3	3	3	1	5	2	2	2	1	2	4	1	2	1	2	1	4	4	1	5	3	3	3	2	1	2
2.128E+02	3	2	3	1	2	2	3	3	4	1	6	2	2	2	1	4	4	2	2	1	2	2	3	3	3	2	3	2	3	2	3	4
2.385E+02	2	3	1	2	3	3	2	3	2	1	4	2	2	2	1	2	2	2	2	1	1	2	3	3	2	3	3	3	4	1	3	2
2.392E+02	2	3	3	1	4	2	2	3	3	1	6	2	2	2	1	2	4	2	1	1	1	2	3	3	3	4	3	2	1	2	4	3
2.440E+02	2	2	3	2	2	3	4	2	2	1	9	3	2	2	1	3	3	2	1	1	1	2	1	1	4	3	4	2	2	4	1	2
2.480E+02	2	2	2	1	2	3	1	3	3	1	3	2	2	2	1	3	2	2	2	2	1	2	1	3	3	2	2	2	3	4	3	3
2.497E+02	3	2	2	1	2	4	2	3	3	1	9	3	2	1	2	2	1	1	1	2	2	2	3	1	4	3	4	3	3	2	3	3
2.619E+02	4	2	1	1	2	4	1	1	4	1	8	3	2	2	2	1	3	2	1	1	1	2	2	2	4	2	4	3	1	3	2	3
2.758E+02	3	2	4	1	3	3	3	2	3	2	2	2	2	2	1	3	3	1	2	2	1	2	3	1	4	3	5	1	2	3	4	3
2.761E+02	3	2	3	2	2	2	3	2	1	1	5	3	2	2	1	2	2	2	2	2	1	1	2	2	4	4	4	3	2	1	4	3
2.777E+02	4	2	1	2	2	3	2	1	4	1	4	3	2	1	1	2	1	2	1	1	1	1	3	2	4	3	4	4	2	4	4	3
2.846E+02	4	2	4	2	1	3	3	2	3	1	6	3	2	1	2	3	1	2	2	2	1	2	1	3	1	4	4	4	3	4	3	2
2.865E+02	1	2	2	2	2	2	3	2	2	1	4	3	2	2	1	3	2	2	1	2	1	2	2	1	3	1	2	3	4	3	4	2
3.023E+02	3	2	1	2	3	3	3	3	3	2	5	2	2	1	1	2	5	2	2	2	1	2	2	2	2	2	3	2	2	2	2	3
3.062E+02	1	1	2	1	2	2	4	2	2	2	6	2	2	2	1	2	4	1	1	1	2	2	2	3	4	3	4	4	4	4	3	3
3.175E+02	3	2	2	1	3	3	3	4	2	1	6	2	2	1	2	3	1	2	1	1	1	2	3	3	3	1	5	3	3	1	3	4
3.525E+02	3	2	2	1	2	3	3	2	3	1	9	2	2	1	1	2	1	2	1	2	2	1	1	4	4	2	3	3	3	2	3	2
3.543E+02	2	1	2	2	3	3	2	1	2	2	6	2	2	1	1	2	3	1	2	2	2	2	2	2	3	1	4	2	3	3	3	1
3.563E+02	3	4	2	2	4	3	2	3	2	1	5	2	2	2	2	2	4	2	2	1	2	2	3	3	2	2	3	2	3	2	4	2
3.588E+02	2	3	2	1	2	1	2	3	1	1	5	3	2	2	1	2	1	1	2	2	1	2	2	1	2	5	2	4	1	2	2	2
3.691E+02	2	3	2	1	2	4	3	2	3	2	6	2	2	1	1	2	1	1	2	1	2	2	1	3	4	1	4	4	2	2	3	2
3.811E+02	2	2	3	1	3	3	2	1	3	1	5	2	2	2	2	2	3	1	1	2	2	2	1	3	1	2	5	3	1	2	3	1
4.065E+02	1	3	3	2	3	2	3	3	4	1	7	3	2	2	2	2	2	2	1	1	2	2	3	2	3	2	4	2	2	2	2	2

```
4.118E+02  1  3  2  1  2  2  2  3  2  1  8  2  2  1  1  2  2  1  2  2  1  2  3  2  3  2  3  3  2  3  1  2
4.176E+02  2  2  2  2  2  3  3  2  2  1  9  2  2  2  1  2  3  2  1  2  2  2  2  3  1  3  5  3  3  3  4  4
4.369E+02  3  2  2  2  2  3  2  3  4  1  2  2  2  1  1  3  5  2  2  1  1  1  2  3  3  3  5  4  3  3  4  2
4.747E+02  2  3  3  1  3  3  2  1  1  1  7  2  2  1  1  2  2  2  2  2  2  2  2  2  1  1  3  3  3  2  3  3
4.974E+02  3  2  2  1  3  1  2  2  2  1  9  2  2  2  1  3  1  3  2  1  2  2  2  3  2  3  3  4  2  3  4  3
5.169E+02  1  2  2  2  4  4  1  2  2  1  2  2  2  1  2  2  1  1  2  2  2  1  1  2  5  5  4  1  3  2  3  2
5.276E+02  3  2  3  1  2  3  1  2  2  2  2  2  2  2  1  2  2  2  1  2  1  1  3  2  2  1  3  2  3  3  2  2
5.978E+02  2  1  4  1  3  2  3  1  3  1  6  2  2  2  2  2  2  3  1  2  2  2  2  3  2  2  3  3  1  3  2  3
6.011E+02  3  2  3  1  3  2  2  2  2  1  3  2  2  2  2  3  3  2  2  2  1  2  2  3  4  2  1  4  3  3  3  3
6.083E+02  3  4  4  1  3  2  2  4  2  2  8  2  2  2  2  2  4  2  2  2  2  1  1  3  3  2  3  3  4  2  3  3
6.106E+02  3  2  3  1  3  3  4  4  3  1  7  2  2  2  1  3  2  1  1  1  1  2  4  3  2  3  2  3  3  3  4  2
6.356E+02  2  2  2  1  3  4  3  2  2  1  6  3  2  2  2  3  5  2  1  1  2  2  1  4  2  2  2  3  2  2  4  3
6.490E+02  3  2  3  1  3  3  2  2  2  1  7  3  2  1  2  3  4  3  1  1  1  2  2  2  2  3  5  3  2  3  2  3
6.888E+02  4  2  2  1  3  2  3  2  3  1  3  2  2  1  1  3  2  1  2  2  2  1  2  3  4  1  4  2  3  1  4  3
6.892E+02  2  1  3  1  3  1  3  3  3  1  3  2  2  2  1  2  4  1  2  2  1  1  1  1  3  2  5  4  2  1  2  3
6.915E+02  3  3  2  2  2  2  3  2  2  1  8  2  2  1  2  2  2  2  2  2  2  2  3  2  2  2  5  3  3  3  4  3
7.112E+02  1  2  2  2  4  3  2  3  3  1  8  2  2  1  1  2  3  3  2  2  1  2  3  3  4  1  4  2  2  2  4  2
7.231E+02  2  1  4  1  4  2  3  2  2  1  4  3  2  2  2  2  3  1  2  1  1  2  2  4  3  2  4  4  2  3  4  3
7.960E+02  2  4  3  1  4  2  2  2  3  2  7  3  2  2  1  2  1  2  2  1  2  2  3  2  1  3  2  2  4  1  2  3
8.236E+02  3  2  3  1  3  2  2  3  1  1  5  2  2  2  2  3  1  2  1  1  2  1  1  2  2  3  5  1  2  1  1  4
8.461E+02  2  2  2  2  3  1  1  3  1  1  2  2  2  1  1  3  3  1  1  2  2  2  1  2  3  2  2  3  2  4  4  2
8.908E+02  2  2  3  2  3  1  2  2  3  1  8  2  2  1  1  2  4  1  1  1  2  1  2  1  2  2  4  4  3  1  3  3
8.915E+02  1  2  3  1  3  2  3  2  2  1  6  2  2  1  1  2  1  2  1  1  2  2  4  3  2  1  4  4  3  4  1  2
8.960E+02  2  2  1  1  3  2  2  4  1  1  6  2  2  2  2  3  3  1  1  1  2  2  2  3  2  2  2  3  4  3  3  3
9.195E+02  4  2  1  2  3  4  4  2  2  1  6  2  2  2  2  2  4  1  1  2  2  1  3  3  2  2  3  2  3  2  3  3
9.460E+02  3  1  4  1  3  3  2  4  3  1  8  3  2  1  1  3  5  1  1  2  2  1  2  1  2  3  3  4  3  2  1  1
1.030E+03  4  2  2  2  3  2  4  2  3  1  3  2  2  2  1  2  1  2  1  2  2  2  2  3  4  2  2  4  2  4  3  4
1.075E+03  3  2  3  2  3  2  2  3  3  1  3  2  2  1  2  2  1  3  1  1  2  2  1  3  3  3  4  4  4  3  4  2
1.181E+03  2  3  1  1  3  2  3  3  3  1  7  3  2  2  1  3  2  1  2  2  2  1  2  2  2  2  4  3  2  3  3  2
1.250E+03  3  2  3  1  4  1  3  3  2  1  6  2  2  1  1  2  4  2  1  1  2  2  3  3  5  4  2  3  2  3  3  3
1.325E+03  2  3  3  2  3  3  2  3  2  1  1  2  2  1  1  3  2  2  2  2  2  2  3  2  4  4  4  2  2  3  1  3
1.364E+03  2  3  4  2  3  3  3  2  3  2  3  2  2  2  2  2  1  1  1  2  2  2  2  3  5  1  4  3  1  3  3  2
1.368E+03  2  3  4  2  3  2  2  2  3  1  5  2  1  2  2  2  2  1  1  1  1  2  3  1  2  2  3  3  2  2  2  3
1.512E+03  3  3  3  2  2  3  3  3  2  1  6  2  1  2  1  2  4  3  2  1  1  1  2  3  3  4  3  4  2  1  4  2
1.669E+03  2  3  4  2  2  3  1  2  3  1  6  3  2  2  2  2  2  1  1  2  1  2  2  4  2  2  3  2  4  2  4  2
1.676E+03  2  3  3  2  2  3  2  2  4  2  9  2  2  1  1  3  2  2  1  1  2  2  2  1  1  2  3  4  2  2  3  3
1.684E+03  2  3  2  1  2  2  3  2  4  1  7  2  2  1  2  3  3  1  1  2  1  2  1  2  3  1  1  3  2  2  2  3
1.693E+03  4  3  3  1  2  3  2  3  2  1  3  2  2  1  1  2  4  1  1  1  2  2  3  4  2  1  4  2  3  2  2  2
1.703E+03  3  3  2  2  2  2  3  3  3  2  6  2  1  2  2  3  2  1  1  1  1  2  2  3  1  3  3  2  2  3  3  3
1.708E+03  2  3  2  1  2  2  1  3  1  1  4  2  2  1  2  2  3  2  1  2  2  2  1  2  1  2  2  2  2  2  4  3
1.739E+03  3  3  4  2  2  1  2  3  3  1  4  2  2  2  2  3  5  2  1  2  2  2  2  3  2  2  4  3  2  2  4  4
1.741E+03  3  3  2  2  2  2  2  3  2  1  3  3  2  2  2  2  3  1  1  1  1  1  2  4  3  2  2  3  2  4  2  3
1.815E+03  2  3  2  1  2  3  2  1  3  1  5  2  1  1  1  3  5  2  1  2  1  2  1  2  2  5  2  3  3  2  2  3
1.983E+03  4  2  3  1  4  2  3  4  3  2  6  2  1  1  2  2  3  2  1  1  2  2  2  1  2  2  4  2  4  2  1  3
2.294E+03  3  3  3  2  2  2  2  2  1  1  9  3  2  2  2  3  3  1  1  2  2  1  3  2  2  3  4  3  3  3  4  3
2.391E+03  1  3  1  1  2  3  2  2  3  1  5  1  2  2  2  2  2  1  1  1  1  1  1  2  2  2  4  4  3  1  3  2
2.440E+03  2  3  2  1  2  2  4  2  4  1  5  3  2  1  2  2  5  2  1  1  1  2  1  2  2  2  3  2  3  3  3  2
2.530E+03  2  3  2  1  2  3  3  3  2  1  8  1  2  1  2  2  4  3  1  1  1  2  1  3  3  2  4  3  4  3  4  3
2.534E+03  3  3  2  1  3  2  2  2  2  1  7  3  2  1  1  3  1  3  1  2  1  2  3  1  3  4  4  4  2  3  3  1
2.557E+03  2  3  2  2  3  3  3  2  2  1  7  3  2  1  1  4  3  2  1  2  1  2  2  2  3  3  3  3  2  3  2  4
2.590E+03  2  3  2  1  3  2  3  3  1  2  5  2  1  2  2  2  2  2  1  2  2  2  2  1  4  3  3  3  3  2  4  2
2.597E+03  3  3  4  1  3  2  1  4  3  2  7  2  1  1  1  1  2  1  1  2  2  1  3  4  3  4  3  3  1  3  4  3
2.619E+03  2  2  2  1  4  2  3  2  1  1  9  2  2  1  2  3  1  1  1  1  1  1  2  4  4  2  3  2  3  3  4  2
2.664E+03  2  3  3  1  3  2  4  3  2  1  2  3  2  1  2  1  3  2  2  2  2  2  3  3  2  4  5  3  3  3  4  3
2.679E+03  3  3  2  2  3  4  4  3  3  1  5  3  2  1  1  1  5  2  1  2  1  2  1  3  2  2  3  2  2  4  4  2
2.691E+03  2  3  3  1  3  2  3  2  3  1  7  2  1  1  2  3  2  1  1  1  1  2  2  3  3  2  4  3  2  2  4  4
2.721E+03  4  3  3  2  3  3  2  4  3  2  3  3  2  1  2  3  2  2  1  1  1  1  3  2  4  4  2  3  2  3  3  3
3.430E+03  3  3  3  2  3  1  3  1  2  1  3  3  2  2  1  3  3  2  1  2  2  1  3  1  4  3  5  2  3  3  3  2
3.465E+03  2  3  2  1  3  2  3  2  3  1  7  2  2  2  1  2  1  3  1  2  1  2  3  3  2  4  4  2  3  4  2  2
3.502E+03  3  3  3  1  3  3  2  2  2  1  6  2  2  2  1  1  5  1  1  2  1  2  2  1  2  4  4  3  3  3  2  4
3.521E+03  2  4  3  2  2  3  2  3  2  1  3  3  2  1  2  2  5  1  2  2  2  2  2  2  2  2  3  3  2  3  3  2
4.236E+03  2  3  4  1  4  4  3  3  3  1  3  3  2  2  2  3  1  1  1  1  2  2  1  2  4  4  3  2  3  2  4  3
4.307E+03  3  3  2  1  4  1  2  2  2  1  9  2  2  1  2  2  4  1  1  2  1  2  2  2  2  2  3  3  1  3  4  2
5.442E+03  2  4  2  1  3  3  2  3  3  1  6  3  2  1  1  2  4  1  2  2  1  2  2  1  5  2  3  2  3  2  3  3
1.074E+04  3  4  4  1  2  3  3  2  2  1  3  2  2  2  2  3  1  2  1  2  2  2  2  2  2  4  4  3  1  2  3  3
1.097E+04  3  4  3  1  2  2  2  2  3  1  6  3  2  2  2  3  5  1  1  2  1  2  2  2  4  2  5  3  2  2  3  4
1.130E+04  2  4  3  1  3  4  2  3  2  1  6  2  2  2  1  3  3  1  2  2  2  2  3  3  2  2  2  3  2  4  3  3
1.332E+04  1  4  3  2  1  3  2  3  3  1  9  2  2  1  1  2  2  1  1  2  2  2  2  1  4  3  4  2  2  3  4  3
1.527E+04  4  4  3  2  1  2  4  3  2  1  5  1  2  1  1  2  1  2  1  2  1  2  1  2  3  2  2  4  4  2  3  2
2.027E+04  4  4  3  2  2  3  2  2  2  1  6  3  2  1  1  2  3  2  1  2  1  2  3  2  4  2  2  3  3  3  3  3
2.255E+04  3  4  3  1  4  3  3  1  3  2  6  2  2  1  1  2  4  1  2  2  1  1  2  2  2  3  4  3  2  4  4  4
2.741E+04  3  4  2  2  3  2  2  3  2  1  3  3  2  2  1  2  5  3  2  1  2  2  3  2  2  2  4  3  2  3  3  4
2.787E+04  2  4  3  1  3  4  1  2  3  1  6  2  2  2  1  3  2  3  1  2  1  2  1  2  2  2  5  3  3  2  3  4
3.017E+04  2  4  2  1  2  3  4  4  3  1  5  3  2  1  1  3  1  2  1  1  1  1  1  2  3  4  4  2  4  3  3  3
     MEAN =     2.052E+03       VARIANCE =      2.523E+07

     PERCENTILES :
          5-TH =     2.467E+01  50-TH =     3.936E+02  95-TH =     1.130E+04
     LOGARITHMIC MIDPOINT (OF POINTS > 0.) =     3.621E+02
     NUMBER ABOVE MIDPOINT = 77
     NUMBER BELOW MIDPOINT =  73
     CHI-SQUARED(1) =     1.067E-01
     DO NOT REJECT NULL (p > .05)
```

CONSEQUENCE MEASURE:
PROPERTY DAMAGE

BASE CASE :
PEACH BOTTOM LLH (CRAC2)

FRACTIONAL CONTRIBUTION OF EACH SEQUENCE TO MEAN RISK

SEQUENCE	CONTRIBUTION
TB	0.1434
TBUX	0.8336
TBU	0.0082
TCSX	0.0044
TCUX	0.0006
TCSRX2	0.0071
TCSRV23	0.0027

CONSEQUENCE MEASURE:
PROPERTY DAMAGE

BASE CASE :
PEACH BOTTOM LLH (CRAC2)

FRACTIONAL CONTRIBUTION OF EACH NONZERO BIN TO MEAN RISK

BIN	CONTRIBUTION
AAACACGGDABCBABBECABBB	0.0001
AAACACGGDABCBABBEDABBB	0.0001
AAACACGGDABCBABBEEABBB	0.0001
AAACACGGDABCBADBEDABBB	0.0001
AAACACGGDABCBADBEEABBB	0.0001
BAACAAGBDABCBBBBHHABBB	0.0001
BAACACGBDAACBBBBHHABBB	0.0015
BAACACGBDAACBDDBHHABBB	0.0010
BAACACGBDABCBBBBHHABBB	0.0002
BAACACGBDABCBDDBHHABBB	0.0001
BAACACGBFAACCBBBHHABBB	0.0003
BAACACGBFAACCDDBHHABBB	0.0001
BAACACGBFABCCBBBHHABBB	0.0001
BAACACGGDAACBABBDDABBB	0.0002
BACBAAGCFABCCBBBHHABBB	0.0002
CAACACBGDDACBABBADABAB	0.0001
CAACACBGDDACBABBAEABAB	0.0001
CAACACBGDDACBCDBACABAB	0.0001
CAACACBGDDACBCDBADABAB	0.0001
CAACACBGDDACBCDBAEABAB	0.0002
CAACACBGFDACBCDBADABAB	0.0001
CAACACBGFDACBCDBAEABAB	0.0001
CAACCCBGDDACBABBAEABAB	0.0001
DAAAAAGBDABCBBBBHHABBB	0.0002
DAAAAAGBDDACBDDBHHABBB	0.0001
DAAAAAGBFABCCBBBHHABBB	0.0002
DAAAAAGBFDACCBBBHHABBB	0.0002
DAAAAAGBFDACCDDBHHABBB	0.0001
DAAAACGBDABCBBBBHHABBB	0.0002
DAAAACGBDDACBBBBHHABBB	0.0015
DAAAACGBDDACBDDBHHABBB	0.0007
DAAAACGBFABCCBBBHHABBB	0.0002
DAAAACGBFDACCBBBHHABBB	0.0006
DAAAACGBFDACCDDBHHABBB	0.0002
DAAAACGGDDACBBBBAEABAB	0.0002
DAAAACGGDDACBDDBADABAB	0.0001
DAAAACGGDDACBDDBAEABAB	0.0002
DAAAACGGDDACBDDBAGABAB	0.0001
DAAACCGDDDACBBBBHHABBB	0.0002
DAAACCGBDDACBDDBHHABBB	0.0001
DABAAAGADABCBDDBHGABAB	0.0001
DABAACGADABCBBBBHGABAB	0.0006
DABAACGADDACBBBBHGABAB	0.0016
DABAACGADDACBDDBHGABAB	0.0003
EBAACCFGFDBCBADBEHBBBB	0.0001
EBAACCGGDDBCBABBEGABBB	0.0066
EBAACCGGDDBCBABBEGBBBB	0.0004
EBAACCGGDDBCBABBEHABBB	0.0025
EBAACCGGDDBCBABBEHBBBB	0.0021
EBAACCGGDDBCBADBEHABBB	0.0013
EBAACCGGDDBCBADBEHBBBB	0.0011
EBACBBGEFCBCCABBFCBABA	0.0001

328

EBACBBGEFCBCCABBFEABBA	0.0003
EBACBBGGDCBCBABBFBBABA	0.0098
EBACBBGGDCBCBABBFCBABA	0.0005
EBACBBGGDCBCBABBFDABBA	0.0008
EBACBBGGDCBCBABBFEABBA	0.0002
EBACBBGGDCBCBABBFFABBA	0.0001
EBACBCGEFCBCCABBFCBABA	0.0001
EBACBCGEFCBCCABBFEABBA	0.0001
EBACBCGGDCBCBABBFBBABA	0.0060
EBACBCGGDCBCBABBFCBABA	0.0005
EBACBCGGDCBCBABBFDABBA	0.0011
EBACBCGGDCBCBABBFEABBA	0.0005
EBACBCGGDCBCBABBFFABBA	0.0001
EBACBCGGDCBCBABBFFBBBA	0.0009
EBACBCGGDCBCBADBFBBABA	0.0057
EBACBCGGDCBCBADBFEABBA	0.0006
EBACBCGGDCBCBADBFFABBA	0.0005
EBACCCDEEDBCCADBFBBABB	0.0002
EBACCCDGFDBCBABBFBBABB	0.0001
EBACCCDGFDBCBADBFBBABB	0.0059
EBACCCDGFDBCBADBFEBBBB	0.0001
EBACCCFGFDBBBABBFBBABB	0.0001
EBACCCFGFDBBBADBFCBABB	0.0013
EBACCCFGFDBBBADBFEABBB	0.0002
EBACCCFGFDBCBABBFBBABB	0.0003
EBACCCFGFDBCBABBFCBABB	0.0018
EBACCCFGFDBCBABBFEABBB	0.0082
EBACCCFGFDBCBABBFEBBBB	0.0001
EBACCCFGFDBCBACBFCBABB	0.0016
EBACCCFGFDBCBACBFEABBB	0.0002
EBACCCFGFDBCBADBFBBABB	0.0007
EBACCCFGFDBCBADBFCABBB	0.0001
EBACCCFGFDBCBADBFCBABB	0.0221
EBACCCFGFDBCBADBFEABBB	0.0019
EBACCCFGFDBCBADBFEBBBB	0.0005
EBACCCFGFDBCBADBFFABBB	0.0002
EBACCCGDFDBCBABBFABAAB	0.0001
EBACCCGEFDBBCABBFBBABB	0.0001
EBACCCGEFDBCCABBFBBABB	0.0001
EBACCCGEFDBCCABBFCBABB	0.0001
EBACCCGEFDBCCABBFEABBB	0.0004
EBACCCGEFDBCCADBFCBABB	0.0108
EBACCCGEFDBCCADBFEBBBB	0.0015
EBACCCGFFDBCBABBFEABBB	0.0001
EBACCCGGDDBBBABBFABABB	0.0004
EBACCCGGDDBBBABBFBBABB	0.0002
EBACCCGGDDBBBABBFEABBB	0.0024
EBACCCGGDDBBBABBFFABBB	0.0018
EBACCCGGDDBBBABBFGABBB	0.0002
EBACCCGGDDBBBADBFABABB	0.0014
EBACCCGGDDBBBADBFCBABB	0.0018
EBACCCGGDDBBBADBFEABBB	0.0004
EBACCCGGDDBBBADBFFBBBB	0.0002
EBACCCGGDDBCBABBFABABB	0.0873
EBACCCGGDDBCBABBFBABAB	0.0004
EBACCCGGDDBCBABBFBBABB	0.2385
EBACCCGGDDBCBABBFCBABB	0.0450
EBACCCGGDDBCBABBFCBBBB	0.0044
EBACCCGGDDBCBABBFDABBB	0.0173
EBACCCGGDDBCBABBFDBBBB	0.0011
EBACCCGGDDBCBABBFEABBB	0.0571
EBACCCGGDDBCBABBFEBBBB	0.0188
EBACCCGGDDBCBABBFFABBB	0.0520
EBACCCGGDDBCBABBFFBBBB	0.0083
EBACCCGGDDBCBABBFGABBB	0.0109
EBACCCGGDDBCBADBFABABB	0.0343
EBACCCGGDDBCBADBFBBABB	0.0707
EBACCCGGDDBCBADBFCBABB	0.0050
EBACCCGGDDBCBADBFEABBB	0.0170
EBACCCGGDDBCBADBFEBBBB	0.0008
EBACCCGGDDBCBADBFFABBB	0.0063
EBACCCGGDDBCBADBFFBBBB	0.0089
EBACCCGGDDBCBADBFGABBB	0.0001
EBACCCGGEDBBBABBFBBABB	0.0004
EBACCCGGEDBBBADBFEABBB	0.0004
EBACCCGGEDBCBABBFBBABB	0.0007
EBACCCGGEDBCBABBFCBABB	0.0168
EBACCCGGEDBCBABBFCBBBB	0.0032
EBACCCGGEDBCBABBFEABBB	0.0113
EBACCCGGEDBCBABBFEBBBB	0.0012
EBACCCGGEDBCBABBFFABBB	0.0001
EBACCCGGEDBCBABBFFBBBB	0.0001
EBACCCGGEDBCBABBFGABBB	0.0001
EBACCCGGEDBCBADBFCBABB	0.0164
EBACCCGGEDBCBADBFDBBBB	0.0001
EBACCCGGEDBCBADBFEABBB	0.0007

EBACCCGGEDBCBADBFEBBBB	0.0010
EBBBACGEFBBCCABBDGABBB	0.0002
EBBBACGEFBBCCABBEGABBB	0.0002
EBBBACGGDBBCBABBDGABBB	0.0002
EBBBACGGDBBCBABBEGABBB	0.0003
EBBBACGGDBBCBADBDGABBB	0.0002
EBBBACGGDBBCBADBEGABBB	0.0002
FCACBBGGDCBCBABBDBBABA	0.0001
FCACBBGGDCBCBABBDCBABA	0.0001
FCACBBGGDCBCBABBDEABBA	0.0001
FCACBBGGDCBCBABBEBBABA	0.0002
FCACBBGGDCBCBABBEEABBA	0.0002
FCACBCGGDCBCBABBDBBABA	0.0001
FCACBCGGDCBCBABBDCBABA	0.0001
FCACBCGGDCBCBABBDEABBA	0.0002
FCACBCGGDCBCBABBEBBABA	0.0002
FCACBCGGDCBCBABBEEABBA	0.0002
FCACBCGGDCBCBADBDCBABA	0.0002
FCACBCGGDCBCBADBDFABBA	0.0001
FCACBCGGDCBCBADBECBABA	0.0002
FCACBCGGDCBCBADBEEABBA	0.0001
FCACCCDGFDBBBADBEBBABB	0.0001
FCACCCDGFDBCBACBDCBABB	0.0001
FCACCCDGFDBCBACBEBBABB	0.0002
FCACCCDGFDBCBADBDBBABB	0.0010
FCACCCDGFDBCBADBDCBABB	0.0005
FCACCCDGFDBCBADBDEABBB	0.0004
FCACCCDGFDBCBADBEBBABB	0.0032
FCACCCDGFDBCBADBECBABB	0.0004
FCACCCFGFDBCBABBDEABBB	0.0001
FCACCCFGFDBCBABBEEABBB	0.0001
FCACCCFGFDBCBABBGEABBB	0.0009
FCACCCFGFDBCBADBDEABBB	0.0001
FCACCCFGFDBCBADBDFABBB	0.0001
FCACCCFGFDBCBADBDFBBBB	0.0001
FCACCCFGFDBCBADBEEABBB	0.0005
FCACCCFGFDBCBADBEGABBB	0.0001
FCACCCFGFDBCBADBGBBABB	0.0001
FCACCCGBDDBCBABBHHABBB	0.0004
FCACCCGBDDBCBABBHHBABB	0.0001
FCACCCGBDDBCBDDBHHABBB	0.0010
FCACCCGBDDBCBDDBHHBABB	0.0007
FCACCCGBFDBCCDDBHHABBB	0.0001
FCACCCGBFDBCCDDBHHBABB	0.0001
FCACCCGDFDBCBADBDCBABB	0.0003
FCACCCGEFDBCCABBEEABBB	0.0001
FCACCCGEFDBCCADBEGABBB	0.0007
FCACCCGGDDBBBABBECBABB	0.0002
FCACCCGGDDBBBABBEEABBB	0.0029
FCACCCGGDDBBBADBGCBABB	0.0007
FCACCCGGDDBCBABBCABABB	0.0001
FCACCCGGDDBCBABBCBBABB	0.0022
FCACCCGGDDBCBABBDABABB	0.0014
FCACCCGGDDBCBABBDBBABB	0.0072
FCACCCGGDDBCBABBDCBABB	0.0041
FCACCCGGDDBCBABBDDABBB	0.0038
FCACCCGGDDBCBABBDEABBB	0.0049
FCACCCGGDDBCBABBDEBBBB	0.0003
FCACCCGGDDBCBABBDFABBB	0.0029
FCACCCGGDDBCBABBDFBBBB	0.0002
FCACCCGGDDBCBABBDGABBB	0.0059
FCACCCGGDDBCBABBEABABB	0.0030
FCACCCGGDDBCBABBEBBABB	0.0111
FCACCCGGDDBCBABBECBABB	0.0030
FCACCCGGDDBCBABBEDABBB	0.0014
FCACCCGGDDBCBABBEEABBB	0.0176
FCACCCGGDDBCBABBEEBBBB	0.0005
FCACCCGGDDBCBABBEFABBB	0.0020
FCACCCGGDDBCBABBEFBBBB	0.0004
FCACCCGGDDBCBABBEGABBB	0.0015
FCACCCGGDDBCBABBGABABB	0.0001
FCACCCGGDDBCBABBGBBABB	0.0018
FCACCCGGDDBCBABBGCBABB	0.0024
FCACCCGGDDBCBABBGEABBB	0.0003
FCACCCGGDDBCBACBEABABB	0.0001
FCACCCGGDDBCBADBDABABB	0.0014
FCACCCGGDDBCBADBDBBABB	0.0023
FCACCCGGDDBCBADBDCBABB	0.0032
FCACCCGGDDBCBADBDEABBB	0.0025
FCACCCGGDDBCBADBDEBBBB	0.0002
FCACCCGGDDBCBADBDFABBB	0.0017
FCACCCGGDDBCBADBDGABBB	0.0069
FCACCCGGDDBCBADBEABABB	0.0024
FCACCCGGDDBCBADBEBBABB	0.0014
FCACCCGGDDBCBADBECBABB	0.0071
FCACCCGGDDBCBADBEEABBB	0.0028

FCACCCGGDDBCBADBEEBFBB	0.0003
FCACCCGGDDBCBADBEFABBB	0.0007
FCACCCGGDDBCBADBEFBBBB	0.0001
FCACCCGGDDBCBADB[illegible]CBABB	0.0011
FCACCCGGDDBCBADB[illegible]ABBB	0.0010
FCACCCGGDDBCBDD[illegible]ABABB	0.0001
FCACCCGGEDBCBABB[illegible]EABBB	0.0003
FCACCCGGEDBCBAB[illegible]EBBABB	0.0001
FCACCCGGEDBCBAB[illegible]ECBABB	0.0001
FCACCCGGEDBCBABBEEABBB	0.0025
FCACCCGGEDBCBABBGEABBB	0.0007
FCACCCGGEDBCBADBCFABBB	0.0002
FCACCCGGEDBCBADBDCBABB	0.0003
FCBBAAGCDBBBBBBBHHABBB	0.0002
FCBBAAGCDBBCBBBBHHABBB	0.0003
FCBBAAGCFBBBCDDBHHABBB	0.0001
FCBBAAGCFBBCCBBBHHABBB	0.0001
FCBBAAGCFBBCCDDBHHABBB	0.0001
FCBBACGCDBBBBBBBHHABBB	0.0003
FCBBACGCDBBCBBBBHHABBB	0.0005
FCBBACGCDBBCBBBBHHBBBB	0.0001
FCBBACGCDBBCBDDBHHABBB	0.0001
FCBBACGCFBBBCBBBHHABBB	0.0001
FCBBACGCFBBBCDDBHHABBB	0.0001
FCBBACGCFBBCCBBBHHABBB	0.0001
FCBBACGCFBBCCDDBHHABBB	0.0004
FCBBACGEFBBCCABBEGABBB	0.0001
FCBBACGGDBBCBABBEGABBB	0.0002
FCBBACGGDBBCBADBECABBB	0.0002
FCCBAAGCFBBBCBBBHHABBB	0.0006
FCCBAAGCFBBBCDDBHHABBB	0.0002
FCCBAAGCFBBCCBBBHHABBB	0.0017
FCCBAAGCFBBCCDDBHHABBB	0.0012

```
CONSEQUENCE MEASURE:
  PROPERTY DAMAGE


  BASE CASE :
   PEACH BOTTOM LLH (CRAC2)

  FRACTIONAL CONTRIBUTIONS OF EACH RELEASE TO MEAN RISK
                    RELEASE                CONTRIBUTION
                    PCH  1D                   0.0001
                    PCH  2D                   0.0004
                    PCH  3D                   0.0058
                    PCH  4D                   0.0027
                    PCH  5D                   0.0170
                    PCH  6D                   0.1649
                    PCH  7D                   0.3024
                    PCH  8D                   0.3094
                    PCH  9D                   0.1827
                    PCH 10D                   0.0000
                    PCH 11D                   0.0000
                    PCH 12D                   0.0000
                    PCH 13D                   0.0000
                    PCH 14D                   0.0000
                    PCH 15D                   0.0001
                    PCH 16D                   0.0000
                    PCH 17D                   0.0000
                    PCH 18D                   0.0000
                    PCH 19D                   0.0000
                    PCH 20D                   0.0001
                    PCH 21D                   0.0004
                    PCH 22D                   0.0004
                    PCH 23D                   0.0003
                    PCH 24D                   0.0006
                    PCH 25D                   0.0000
                    PCH 26D                   0.0007
                    PCH 27D                   0.0008
                    PCH 28D                   0.0017
                    PCH 29D                   0.0001
                    PCH 30D                   0.0015
                    PCH 31D                   0.0003
                    PCH 32D                   0.0002
                    PCH 33D                   0.0002
                    PCH 34D                   0.0010
                    PCH 35D                   0.0000
                    PCH 36D                   0.0014
                    PCH 37D                   0.0002
                    PCH 38D                   0.0003
                    PCH 39D                   0.0005
                    PCH 40D                   0.0001
                    PCH 41D                   0.0016
                    PCH 42D                   0.0002
                    PCH 43D                   0.0001
                    PCH 44D                   0.0001
                    PCH 45D                   0.0001
                    PCH 46D                   0.0010
                    PCH 47D                   0.0002
                    PCH 48D                   0.0001
                    PCH 49D                   0.0000
                    PCH 50D                   0.0002
                    PCH 51D                   0.0000
                    PCH 52D                   0.0000
                    PCH 53D                   0.0000
                    PCH 54D                   0.0000
```

```
CONSEQUENCE MEASURE:
 PROPERTY DAMAGE

 SENSITIVITY OF RISK TO ISSUES
 DISTRIBUTION OF RISK AT EACH LEVEL OF EACH ISSUE
 BASE CASE :
  PEACH BOTTOM LLB (CRAC2)

GP ISS LVL NUM      5%          50%          MEAN         95%        R**2    F   DF       SIGNIF.
 1   1   1  15  0.5138E+02  0.3062E+03  0.1334E+04  0.8670E+04    0.01     0.7(  3,146)    0.58NS
         3  60  0.2024E+02  0.3098E+03  0.1887E+04  0.1086E+05
         2  60  0.1760E+02  0.6164E+03  0.2147E+04  0.7842E+04
         4  15  0.4823E+02  0.6888E+03  0.3050E+04  0.1888E+05
 1   2   1  15  0.1379E+02  0.1994E+03  0.3266E+03  0.8846E+03    0.26    17.1(  3,146)    0.00**
         2  60  0.1558E+02  0.2759E+03  0.4222E+03  0.1159E+04
         3  60  0.3351E+02  0.1251E+04  0.1283E+04  0.3483E+04
         4  15  0.4072E+03  0.1130E+05  0.1337E+05  0.2958E+05
 1   3   1  15  0.2488E+02  0.2385E+03  0.4709E+03  0.2004E+04    0.04     2.2(  3,146)    0.09NS
         2  60  0.2048E+02  0.3575E+03  0.1823E+04  0.4841E+04
         4  15  0.1257E+03  0.9460E+03  0.1831E+04  0.8514E+04
         3  60  0.2024E+02  0.5005E+03  0.2731E+04  0.1759E+05
 1   4   2  62  0.2301E+02  0.3553E+03  0.1942E+04  0.1407E+05    0.00     0.1(  1,148)    0.78NS
         1  88  0.2444E+02  0.4421E+03  0.2129E+04  0.1101E+05
 1   5   2  60  0.4244E+02  0.2769E+03  0.1852E+04  0.1086E+05    0.10     5.7(  3,146)    0.00**
         1  15  0.[illegible]391E+01  0.5885E+02  0.1972E+04  0.1476E+05
         3  60  0.2911E+02  0.6686E+03  0.2111E+04  0.7842E+04
         4  15  0.2235E+02  0.7231E+03  0.2697E+04  0.1491E+05
 2   1   1  15  0.2917E+02  0.4974E+03  0.9811E+03  0.4068E+04    0.00     0.0(  3,146)    1.00NS
         2  60  0.2160E+02  0.5995E+03  0.1703E+04  0.6166E+04
         3  60  0.2911E+02  0.3534E+03  0.2357E+04  0.1643E+05
         4  15  0.1965E+02  0.3691E+03  0.3301E+04  0.2224E+05
 2   2   3  60  0.2510E+02  0.2943E+03  0.1311E+04  0.3831E+04    0.02     1.1(  3,146)    0.34NS
         2  60  0.4259E+02  0.5468E+03  0.2258E+04  0.1227E+05
         1  15  0.1379E+02  0.2519E+03  0.2450E+04  0.1540E+05
         4  15  0.2251E+02  0.6106E+03  0.3793E+04  0.2545E+05
 2   3   3  60  0.1444E+02  0.3282E+03  0.1909E+04  0.1227E+05    0.01     0.6(  3,146)    0.59NS
         2  60  0.2617E+02  0.5632E+03  0.2020E+04  0.1086E+05
         1  15  0.3580E+02  0.2777E+03  0.2040E+04  0.1408E+05
         4  15  0.2680E+02  0.6083E+03  0.2763E+04  0.1653E+05
 2   4   4  15  0.8194E+01  0.2128E+03  0.5371E+03  0.2224E+04    0.02     0.9(  3,146)    0.47NS
         1  15  0.1849E+02  0.4747E+03  0.8831E+03  0.2612E+04
         2  60  0.3643E+02  0.4147E+03  0.2171E+04  0.1314E+05
         3  60  0.2024E+02  0.6042E+03  0.2604E+04  0.1733E+05
 2   5   2  24  0.3495E+02  0.3616E+03  0.1730E+04  0.5131E+04    0.00     0.0(  1,148)    1.00NS
         1 126  0.2152E+02  0.4091E+03  0.2113E+04  0.1168E+05
 2   6   8  16  0.1956E+02  0.2557E+03  0.4918E+03  0.1883E+04    0.04     0.8(  8,141)    0.62NS
         2  11  0.1231E+03  0.2758E+03  0.5581E+03  0.2516E+04
         4   9  0.2241E+02  0.2777E+03  0.5755E+03  0.1739E+04
         1   2************************  0.6754E+03************
         7  20  0.2215E+02  0.5384E+03  0.1024E+04  0.3054E+04
         9  12  0.3523E+02  0.4558E+03  0.2156E+04  0.1190E+05
         5  22  0.2002E+02  0.3575E+03  0.2826E+04  0.2005E+05
         3  20  0.2634E+02  0.1052E+04  0.3081E+04  0.1716E+05
         6  38  0.1294E+02  0.3354E+03  0.3082E+04  0.2161E+05
 2   7   2  94  0.3303E+02  0.4147E+03  0.1613E+04  0.8949E+04    0.01     0.4(  2,147)    0.65NS
         3  51  0.1472E+02  0.2865E+03  0.2661E+04  0.1966E+05
         1   5  0.1033E+03  0.2391E+04  0.4095E+04  0.1527E+05
 2   8   1  15  0.1347E+02  0.1368E+04  0.1137E+04  0.2667E+04    0.00     0.1(  1,148)    0.80NS
         2 135  0.2585E+02  0.3811E+03  0.2154E+04  0.1278E+05
 2   9   2  75  0.1510E+02  0.3588E+03  0.1857E+04  0.1092E+05    0.00     0.6(  1,148)    0.43NS
         1  75  0.2963E+02  0.4369E+03  0.2247E+04  0.1476E+05
 2  10   2  75  0.1701E+02  0.3563E+03  0.1141E+04  0.4045E+04    0.01     1.6(  1,148)    0.18NS
         1  75  0.2999E+02  0.4176E+03  0.2963E+04  0.2196E+05
 2  11   4   4************************  0.7596E+03************    0.05     2.4(  3,146)    0.07NS
         1  16  0.6255E+01  0.9168E+02  0.7791E+03  0.3231E+04
         2  80  0.3351E+02  0.3936E+03  0.1991E+04  0.1426E+05
         3  50  0.2467E+02  0.6423E+03  0.2661E+04  0.1130E+05
 2  12   3  38  0.2816E+02  0.2687E+03  0.1514E+04  0.7013E+04    0.04     1.5(  4,145)    0.22NS
         2  45  0.1408E+02  0.2761E+03  0.1560E+04  0.4047E+04
         4  22  0.2996E+02  0.6283E+03  0.2032E+04  0.9611E+04
         1  30  0.3432E+02  0.4285E+03  0.2627E+04  0.1527E+05
         5  15  0.1140E+02  0.1739E+04  0.3769E+04  0.2180E+05
 2  13   2  75  0.2296E+02  0.2777E+03  0.1628E+04  0.8077E+04    0.03     2.3(  2,147)    0.10NS
         1  60  0.2705E+02  0.6485E+03  0.1943E+04  0.1114E+05
         3  15  0.1988E+02  0.7112E+03  0.4611E+04  0.2775E+05
 2  14   2  75  0.1701E+02  0.1824E+03  0.1224E+04  0.4881E+04    0.23    43.0(  1,148)    0.00**
         1  75  0.6609E+02  0.1075E+04  0.2880E+04  0.1476E+05
 2  15   1  60  0.2024E+02  0.3873E+03  0.1739E+04  0.3395E+04    0.00     0.0(  1,148)    0.88NS
         2  90  0.2553E+02  0.3961E+03  0.2261E+04  0.1332E+05
 2  16   2  75  0.2296E+02  0.4747E+03  0.1572E+04  0.8514E+04    0.00     0.0(  1,148)    1.00NS
         1  75  0.2585E+02  0.3023E+03  0.2532E+04  0.1888E+05
 2  17   2 120  0.2024E+02  0.3118E+03  0.1881E+04  0.1114E+05    0.03     5.1(  1,148)    0.03 *
         1  30  0.8820E+02  0.7535E+03  0.2735E+04  0.2255E+05
 3   1   4   3************************  0.5687E+03************    0.02     0.8(  3,146)    0.50NS
         2  74  0.1693E+02  0.3042E+03  0.1533E+04  0.9378E+04
         3  39  0.2562E+02  0.4118E+03  0.2356E+04  0.1558E+05
```

BEST COPY AVAILABLE

```
          1  34  0.2972E+02  0.5607E+03  0.2964E+04  0.2471E+05
 3   2    4  15  0.2716E+02  0.3525E+03  0.8461E+03  0.2614E+04    0.01    0.4(  3,146)   0.77NS
          3  51  0.3432E+02  0.3811E+03  0.9297E+03  0.2691E+04
          1  29  0.2194E+02  0.2758E+03  0.1417E+04  0.5691E+04
          2  55  0.1701E+02  0.5169E+03  0.3756E+04  0.2611E+05
 3   3    1  14  0.3659E+02  0.3293E+03  0.5904E+03  0.1707E+04    0.01    0.4(  4,145)   0.82NS
          5   7  0.6971E+01  0.5169E+03  0.1260E+04  0.5442E+04
          4  35  0.1833E+02  0.2761E+03  0.1947E+04  0.1269E+05
          3  36  0.3490E+02  0.3795E+03  0.1987E+04  0.9072E+04
          2  58  0.1983E+02  0.6423E+03  0.2604E+04  0.1710E+05
 3   4    5   5  0.4440E+02  0.3588E+03  0.5879E+03  0.1815E+04    0.01    0.3(  4,145)   0.90NS
          1  15  0.1169E+03  0.4747E+03  0.6555E+03  0.1691E+04
          3  30  0.3434E+02  0.4271E+03  0.1902E+04  0.1332E+05
          2  76  0.1943E+02  0.3684E+03  0.2232E+04  0.1395E+05
          4  24  0.1729E+02  0.5966E+03  0.2847E+04  0.1465E+05
 3   5    1   4************************  0.6255E+03************    0.03    1.0(  4,145)   0.43NS
          3  46  0.2324E+02  0.3830E+03  0.1072E+04  0.4250E+04
          2  35  0.2600E+02  0.2018E+03  0.1818E+04  0.1416E+05
          4  50  0.1463E+02  0.4584E+03  0.2849E+04  0.2255E+05
          5  15  0.1266E+03  0.6490E+03  0.3327E+04  0.2208E+05
 3   6    1   4************************  0.4544E+03************    0.01    0.4(  3,146)   0.77NS
          4  23  0.2669E+02  0.6892E+03  0.1430E+04  0.4751E+04
          2  47  0.2838E+02  0.3023E+03  0.1825E+04  0.6224E+04
          3  76  0.1662E+02  0.3665E+03  0.2465E+04  0.1701E+05
 3   7    1  18  0.1112E+02  0.2078E+03  0.1193E+04  0.7454E+04    0.03    1.4(  3,146)   0.23NS
          3  55  0.4064E+02  0.4176E+03  0.1810E+04  0.5112E+04
          2  62  0.1759E+02  0.4526E+03  0.2105E+04  0.1207E+05
          4  15  0.1058E+03  0.7960E+03  0.3750E+04  0.2545E+05
 3   8    1  25  0.2084E+02  0.9359E+02  0.3800E+03  0.1696E+04    0.13    7.4(  3,146)   0.00**
          2  58  0.1539E+02  0.3544E+03  0.1815E+04  0.1088E+05
          3  52  0.7402E+02  0.6699E+03  0.2825E+04  0.1944E+05
          4  15  0.1197E+03  0.8461E+03  0.3078E+04  0.1897E+05
 3   9    1  12  0.1777E+02  0.3170E+03  0.5815E+03  0.1904E+04    0.01    0.6(  3,146)   0.60NS
          2  27  0.2517E+02  0.4065E+03  0.8724E+03  0.3470E+04
          4  54  0.1593E+02  0.3857E+03  0.1529E+04  0.4292E+04
          3  57  0.3363E+02  0.3811E+03  0.3415E+04  0.2466E+05
 3  10    1   7  0.1463E+02  0.3543E+03  0.6280E+03  0.2534E+04    0.01    0.5(  3,146)   0.68NS
          2  49  0.1590E+02  0.4065E+03  0.1230E+04  0.3557E+04
          3  73  0.2710E+02  0.4747E+03  0.1920E+04  0.1121E+05
          4  21  0.5719E+02  0.4176E+03  0.4904E+04  0.2761E+05
 3  11    1  75  0.2488E+02  0.4176E+03  0.1652E+04  0.3516E+04    0.00    0.1(  1,148)   0.71NS
          2  75  0.2012E+02  0.3691E+03  0.2452E+04  0.1476E+05
 3  12    2  50  0.1661E+02  0.2803E+03  0.9169E+03  0.2691E+04    0.02    1.4(  2,147)   0.24NS
          3  50  0.2467E+02  0.3575E+03  0.2023E+04  0.1332E+05
          1  50  0.4084E+02  0.5676E+03  0.3217E+04  0.2255E+05
 3  13    4  37  0.2541E+02  0.4065E+03  0.1062E+04  0.4014E+04    0.03    1.3(  3,146)   0.28NS
          1  38  0.1459E+02  0.3293E+03  0.1203E+04  0.6203E+04
          3  38  0.3335E+02  0.3639E+03  0.2954E+04  0.2161E+05
          2  37  0.2010E+02  0.4747E+03  0.2986E+04  0.2152E+05
 3  14    3  30  0.1463E+02  0.4996E+03  0.1060E+04  0.3502E+04    0.01    0.4(  4,145)   0.78NS
          4  30  0.4057E+02  0.4253E+03  0.1465E+04  0.4236E+04
          2  30  0.2467E+02  0.3109E+03  0.2451E+04  0.2027E+05
          5  30  0.6971E+01  0.2468E+03  0.2505E+04  0.1527E+05
          1  30  0.1828E+02  0.5792E+03  0.2779E+04  0.2787E+05
 4   1    6  19  0.3042E+02  0.2015E+03  0.7490E+03  0.3447E+04    0.05    1.1(  7,142)   0.37NS
          3  19  0.7784E+02  0.4974E+03  0.8294E+03  0.2991E+04
          4  19  0.1851E+02  0.8915E+03  0.1343E+04  0.3946E+04
          1  19  0.1900E+02  0.2846E+03  0.1813E+04  0.9754E+04
          2  18  0.8822E+01  0.5165E+03  0.2418E+04  0.1206E+05
          5  19  0.8974E+02  0.7960E+03  0.2674E+04  0.1237E+05
          8  19  0.3433E+02  0.2440E+03  0.3171E+04  0.2523E+05
          7  18  0.7720E+01  0.5616E+03  0.3514E+04  0.2191E+05
NS=NOT SIGNIFICANT, *=SIGNIFICANT (P<.05), **=SIGNIFICANT (P<.01)
```

```
     CONSEQUENCE MEASURE:  PROPERTY DAMAGE
0    ISSUE GROUP =  1   ISSUE =  1   SLC FAILURE TO ACTUATE

     LEVEL 1 NO.<MED.=  8 NO. EXP.=  7     NO.>=MED.=  7 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
     LEVEL 2 NO.<MED.= 26 NO. EXP.= 30     NO.>=MED.= 34 NO. EXP.= 30   CHI-SQ.=   1.1 DF= 1 SIG.= 0.302
     LEVEL 3 NO.<MED.= 33 NO. EXP.= 30     NO.>=MED.= 27 NO. EXP.= 30   CHI-SQ.=   0.6 DF= 1 SIG.= 0.439
     LEVEL 4 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   1.9 DF=  7  SIG.= 0.963

0    ISSUE GROUP =  1   ISSUE =  2   DC COMMON MODE

     LEVEL 1 NO.<MED.= 11 NO. EXP.=  7     NO.>=MED.=  4 NO. EXP.=  8   CHI-SQ.=   4.3 DF= 1 SIG.= 0.038
     LEVEL 2 NO.<MED.= 37 NO. EXP.= 30     NO.>=MED.= 23 NO. EXP.= 30   CHI-SQ.=   3.3 DF= 1 SIG.= 0.071
     LEVEL 3 NO.<MED.= 25 NO. EXP.= 30     NO.>=MED.= 35 NO. EXP.= 30   CHI-SQ.=   1.7 DF= 1 SIG.= 0.197
     LEVEL 4 NO.<MED.=  1 NO. EXP.=  7     NO.>=MED.= 14 NO. EXP.=  8   CHI-SQ.=   9.6 DF= 1 SIG.= 0.002
     OVERALL CHI-SQ=  18.9 DF=  7  SIG.= 0.009

0    ISSUE GROUP =  1   ISSUE =  3   FAILURE TO VENT

     LEVEL 1 NO.<MED.= 11 NO. EXP.=  7     NO.>=MED.=  4 NO. EXP.=  8   CHI-SQ.=   4.3 DF= 1 SIG.= 0.038
     LEVEL 2 NO.<MED.= 32 NO. EXP.= 30     NO.>=MED.= 28 NO. EXP.= 30   CHI-SQ.=   0.3 DF= 1 SIG.= 0.606
     LEVEL 3 NO.<MED.= 27 NO. EXP.= 30     NO.>=MED.= 33 NO. EXP.= 30   CHI-SQ.=   0.6 DF= 1 SIG.= 0.439
     LEVEL 4 NO.<MED.=  4 NO. EXP.=  7     NO.>=MED.= 11 NO. EXP.=  8   CHI-SQ.=   2.4 DF= 1 SIG.= 0.120
     OVERALL CHI-SQ=   7.6 DF=  7  SIG.= 0.373

0    ISSUE GROUP =  1   ISSUE =  4   SW MOD A VS. MOD B

     LEVEL 1 NO.<MED.= 42 NO. EXP.= 44     NO.>=MED.= 46 NO. EXP.= 44   CHI-SQ.=   0.2 DF= 1 SIG.= 0.670
     LEVEL 2 NO.<MED.= 32 NO. EXP.= 31     NO.>=MED.= 30 NO. EXP.= 31   CHI-SQ.=   0.1 DF= 1 SIG.= 0.799
     OVERALL CHI-SQ=   0.2 DF=  3  SIG.= 0.970

0    ISSUE GROUP =  1   ISSUE =  5   POWER RECOVERY

     LEVEL 1 NO.<MED.= 13 NO. EXP.=  7     NO.>=MED.=  2 NO. EXP.=  8   CHI-SQ.=   9.6 DF= 1 SIG.= 0.002
     LEVEL 2 NO.<MED.= 36 NO. EXP.= 30     NO.>=MED.= 24 NO. EXP.= 30   CHI-SQ.=   2.4 DF= 1 SIG.= 0.121
     LEVEL 3 NO.<MED.= 20 NO. EXP.= 30     NO.>=MED.= 40 NO. EXP.= 30   CHI-SQ.=   6.7 DF= 1 SIG.= 0.010
     LEVEL 4 NO.<MED.=  5 NO. EXP.=  7     NO.>=MED.= 10 NO. EXP.=  8   CHI-SQ.=   1.1 DF= 1 SIG.= 0.301
     OVERALL CHI-SQ=  19.8 DF=  7  SIG.= 0.006

0    ISSUE GROUP =  2   ISSUE =  1   PROB. OF STUCK OPEN VAC. BRKR.

     LEVEL 1 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 2 NO.<MED.= 27 NO. EXP.= 30     NO.>=MED.= 33 NO. EXP.= 30   CHI-SQ.=   0.6 DF= 1 SIG.= 0.439
     LEVEL 3 NO.<MED.= 32 NO. EXP.= 30     NO.>=MED.= 28 NO. EXP.= 30   CHI-SQ.=   0.3 DF= 1 SIG.= 0.606
     LEVEL 4 NO.<MED.=  8 NO. EXP.=  7     NO.>=MED.=  7 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
     OVERALL CHI-SQ=   1.1 DF=  7  SIG.= 0.992

0    ISSUE GROUP =  2   ISSUE =  2   HPSW-SPRAY

     LEVEL 1 NO.<MED.=  8 NO. EXP.=  7     NO.>=MED.=  7 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
     LEVEL 2 NO.<MED.= 25 NO. EXP.= 30     NO.>=MED.= 35 NO. EXP.= 30   CHI-SQ.=   1.7 DF= 1 SIG.= 0.197
     LEVEL 3 NO.<MED.= 34 NO. EXP.= 30     NO.>=MED.= 26 NO. EXP.= 30   CHI-SQ.=   1.1 DF= 1 SIG.= 0.302
     LEVEL 4 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   3.0 DF=  7  SIG.= 0.885

0    ISSUE GROUP =   2   ISSUE =   3   VENT-SBO-HACR

     LEVEL 1 NO.<MED.=  9 NO. EXP.=  7     NO.>=MED.=  6 NO. EXP.=  8   CHI-SQ.=   1.1 DF= 1 SIG.= 0.301
     LEVEL 2 NO.<MED.= 26 NO. EXP.= 30     NO.>=MED.= 34 NO. EXP.= 30   CHI-SQ.=   1.1 DF= 1 SIG.= 0.302
     LEVEL 3 NO.<MED.= 32 NO. EXP.= 30     NO.>=MED.= 28 NO. EXP.= 30   CHI-SQ.=   0.3 DF= 1 SIG.= 0.606
     LEVEL 4 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   2.4 DF=  7  SIG.= 0.934

0    ISSUE GROUP =   2   ISSUE =   4   VENT-SBO-ACR

     LEVEL 1 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 2 NO.<MED.= 29 NO. EXP.= 30     NO.>=MED.= 31 NO. EXP.= 30   CHI-SQ.=   0.1 DF= 1 SIG.= 0.796
     LEVEL 3 NO.<MED.= 28 NO. EXP.= 30     NO.>=MED.= 32 NO. EXP.= 30   CHI-SQ.=   0.3 DF= 1 SIG.= 0.606
     LEVEL 4 NO.<MED.= 10 NO. EXP.=  7     NO.>=MED.=  5 NO. EXP.=  8   CHI-SQ.=   2.4 DF= 1 SIG.= 0.120
     OVERALL CHI-SQ=   2.7 DF=  7  SIG.= 0.908

0    ISSUE GROUP =   2   ISSUE =   5   SP BYPASS, SMALL/LARGE

     LEVEL 1 NO.<MED.= 61 NO. EXP.= 63     NO.>=MED.= 65 NO. EXP.= 63   CHI-SQ.=   0.1 DF= 1 SIG.= 0.722
     LEVEL 2 NO.<MED.= 13 NO. EXP.= 12     NO.>=MED.= 11 NO. EXP.= 12   CHI-SQ.=   0.2 DF= 1 SIG.= 0.683
     OVERALL CHI-SQ=   0.3 DF=  3  SIG.= 0.961

0    ISSUE GROUP =   2   ISSUE =   6   CONT FAILURE PRESS. (T<500F B VB)

     LEVEL 1 NO.<MED.=  1 NO. EXP.=  1     NO.>=MED.=  1 NO. EXP.=  1   TEST CANNOT BE RUN; EXP. NO. < 3
     LEVEL 2 NO.<MED.=  6 NO. EXP.=  5     NO.>=MED.=  5 NO. EXP.=  6   CHI-SQ.=   0.4 DF= 1 SIG.= 0.545
     LEVEL 3 NO.<MED.=  6 NO. EXP.= 10     NO.>=MED.= 14 NO. EXP.= 10   CHI-SQ.=   3.2 DF= 1 SIG.= 0.074
     LEVEL 4 NO.<MED.=  6 NO. EXP.=  4     NO.>=MED.=  3 NO. EXP.=  5   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 5 NO.<MED.= 12 NO. EXP.= 11     NO.>=MED.= 10 NO. EXP.= 11   CHI-SQ.=   0.2 DF= 1 SIG.= 0.670
     LEVEL 6 NO.<MED.= 21 NO. EXP.= 19     NO.>=MED.= 17 NO. EXP.= 19   CHI-SQ.=   0.4 DF= 1 SIG.= 0.516
     LEVEL 7 NO.<MED.=  8 NO. EXP.= 10     NO.>=MED.= 12 NO. EXP.= 10   CHI-SQ.=   0.8 DF= 1 SIG.= 0.371
     LEVEL 8 NO.<MED.=  9 NO. EXP.=  8     NO.>=MED.=  7 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.617
     LEVEL 9 NO.<MED.=  5 NO. EXP.=  6     NO.>=MED.=  7 NO. EXP.=  6   CHI-SQ.=   0.3 DF= 1 SIG.= 0.564
     OVERALL CHI-SQ=   5.6 DF= 15  SIG.= 0.986

0    ISSUE GROUP =   2   ISSUE =   7   LATE FAILURE LOCATION (800-1200 A VB)

     LEVEL 1 NO.<MED.=  2 NO. EXP.=  2     NO.>=MED.=  3 NO. EXP.=  3  TEST CANNOT BE RUN; EXP. NO. < 3
     LEVEL 2 NO.<MED.= 45 NO. EXP.= 47     NO.>=MED.= 49 NO. EXP.= 47   CHI-SQ.=   0.2 DF= 1 SIG.= 0.680
     LEVEL 3 NO.<MED.= 27 NO. EXP.= 25     NO.>=MED.= 24 NO. EXP.= 26   CHI-SQ.=   0.3 DF= 1 SIG.= 0.575
     OVERALL CHI-SQ=   0.5 DF=  3  SIG.= 0.922

0    ISSUE GROUP =   2   ISSUE =   8   CONT FAILURE SIZE, RAPID PRESS.
```

```
      LEVEL 1 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
      LEVEL 2 NO.<MED.= 67 NO. EXP.= 67     NO.>=MED.= 68 NO. EXP.= 68   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
      OVERALL CHI-SQ=   0.0 DF=  3  SIG.= 1.000

0     ISSUE GROUP =   2   ISSUE =   9   CONT FAILURE SIZE, SLOW PRESS.

      LEVEL 1 NO.<MED.= 36 NO. EXP.= 37     NO.>=MED.= 39 NO. EXP.= 38   CHI-SQ.=   0.1 DF= 1 SIG.= 0.817
      LEVEL 2 NO.<MED.= 38 NO. EXP.= 37     NO.>=MED.= 37 NO. EXP.= 38   CHI-SQ.=   0.1 DF= 1 SIG.= 0.817
      OVERALL CHI-SQ=   0.1 DF=  3  SIG.= 0.991

0     ISSUE GROUP =   2   ISSUE =  10   VB MODE, HIGH-P FLOW MELT

      LEVEL 1 NO.<MED.= 36 NO. EXP.= 37     NO.>=MED.= 39 NO. EXP.= 38   CHI-SQ.=   0.1 DF= 1 SIG.= 0.817
      LEVEL 2 NO.<MED.= 38 NO. EXP.= 37     NO.>=MED.= 37 NO. EXP.= 38   CHI-SQ.=   0.1 DF= 1 SIG.= 0.817
      OVERALL CHI-SQ=   0.1 DF=  3  SIG.= 0.991

0     ISSUE GROUP =   2   ISSUE =  11   CONT PRESS. BEFORE VB, LONG TERM TB

      LEVEL 1 NO.<MED.= 12 NO. EXP.=  8     NO.>=MED.=  4 NO. EXP.=  8   CHI-SQ.=   4.0 DF= 1 SIG.= 0.046
      LEVEL 2 NO.<MED.= 39 NO. EXP.= 40     NO.>=MED.= 41 NO. EXP.= 40   CHI-SQ.=   0.1 DF= 1 SIG.= 0.823
      LEVEL 3 NO.<MED.= 20 NO. EXP.= 25     NO.>=MED.= 30 NO. EXP.= 25   CHI-SQ.=   2.0 DF= 1 SIG.= 0.157
      LEVEL 4 NO.<MED.=  3 NO. EXP.=  2     NO.>=MED.=  1 NO. EXP.=  2   TEST CANNOT BE RUN; EXP. NO. < 3
      OVERALL CHI-SQ=   6.1 DF=  5  SIG.= 0.301

0     ISSUE GROUP =   2   ISSUE =  12   PRESSURE RISE AT VB

      LEVEL 1 NO.<MED.= 15 NO. EXP.= 15     NO.>=MED.= 15 NO. EXP.= 15   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
      LEVEL 2 NO.<MED.= 24 NO. EXP.= 22     NO.>=MED.= 21 NO. EXP.= 23   CHI-SQ.=   0.4 DF= 1 SIG.= 0.551
      LEVEL 3 NO.<MED.= 21 NO. EXP.= 19     NO.>=MED.= 17 NO. EXP.= 19   CHI-SQ.=   0.4 DF= 1 SIG.= 0.516
      LEVEL 4 NO.<MED.= 10 NO. EXP.= 11     NO.>=MED.= 12 NO. EXP.= 11   CHI-SQ.=   0.2 DF= 1 SIG.= 0.670
      LEVEL 5 NO.<MED.=  4 NO. EXP.=  7     NO.>=MED.= 11 NO. EXP.=  8   CHI-SQ.=   2.4 DF= 1 SIG.= 0.120
      OVERALL CHI-SQ=   3.4 DF=  9  SIG.= 0.948

0     ISSUE GROUP =   2   ISSUE =  13   DELTA P DUE TO SUMP WATER INTERACT.

      LEVEL 1 NO.<MED.= 26 NO. EXP.= 30     NO.>=MED.= 34 NO. EXP.= 30   CHI-SQ.=   1.1 DF= 1 SIG.= 0.302
      LEVEL 2 NO.<MED.= 44 NO. EXP.= 37     NO.>=MED.= 31 NO. EXP.= 38   CHI-SQ.=   2.6 DF= 1 SIG.= 0.106
      LEVEL 3 NO.<MED.=  4 NO. EXP.=  7     NO.>=MED.= 11 NO. EXP.=  8   CHI-SQ.=   2.4 DF= 1 SIG.= 0.120
      OVERALL CHI-SQ=   6.1 DF=  5  SIG.= 0.297

0     ISSUE GROUP =   2   ISSUE =  14   PROB OF DRY DW MELT THROUGH

      LEVEL 1 NO.<MED.= 21 NO. EXP.= 37     NO.>=MED.= 54 NO. EXP.= 38   CHI-SQ.=  13.7 DF= 1 SIG.= 0.000
      LEVEL 2 NO.<MED.= 53 NO. EXP.= 37     NO.>=MED.= 22 NO. EXP.= 38   CHI-SQ.=  13.7 DF= 1 SIG.= 0.000
      OVERALL CHI-SQ=  27.3 DF=  3  SIG.= 0.000

0     ISSUE GROUP =   2   ISSUE =  15   PROB OF WET DW MELT THROUGH

      LEVEL 1 NO.<MED.= 30 NO. EXP.= 30     NO.>=MED.= 30 NO. EXP.= 30   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
      LEVEL 2 NO.<MED.= 44 NO. EXP.= 45     NO.>=MED.= 46 NO. EXP.= 45   CHI-SQ.=   0.0 DF= 1 SIG.= 0.833
```

```
     OVERALL CHI-SQ=   0.0 DF=  3  SIG.= 0.998

0    ISSUE GROUP =   2   ISSUE =  16   PROB OF DW M-THRU W/HI-P MELT EJECT

     LEVEL 1 NO.<MED.= 40 NO. EXP.= 37     NO.>=MED.= 35 NO. EXP.= 38   CHI-SQ.=   0.5 DF= 1 SIG.= 0.488
     LEVEL 2 NO.<MED.= 34 NO. EXP.= 37     NO.>=MED.= 41 NO. EXP.= 38   CHI-SQ.=   0.5 DF= 1 SIG.= 0.488
     OVERALL CHI-SQ=   1.0 DF=  3  SIG.= 0.811

0    ISSUE GROUP =   2   ISSUE =  17   PROB OF H2 BURNS IN RB LEADING TO BP

     LEVEL 1 NO.<MED.=  9 NO. EXP.= 15     NO.>=MED.= 21 NO. EXP.= 15   CHI-SQ.=   4.8 DF= 1 SIG.= 0.028
     LEVEL 2 NO.<MED.= 65 NO. EXP.= 60     NO.>=MED.= 55 NO. EXP.= 60   CHI-SQ.=   0.8 DF= 1 SIG.= 0.361
     OVERALL CHI-SQ=   5.6 DF=  3  SIG.= 0.131

0    ISSUE GROUP =   3   ISSUE =   1   IN-VES RELEASE FROM FUEL

     LEVEL 1 NO.<MED.= 15 NO. EXP.= 17     NO.>=MED.= 19 NO. EXP.= 17   CHI-SQ.=   0.5 DF= 1 SIG.= 0.493
     LEVEL 2 NO.<MED.= 40 NO. EXP.= 37     NO.>=MED.= 34 NO. EXP.= 37   CHI-SQ.=   0.5 DF= 1 SIG.= 0.486
     LEVEL 3 NO.<MED.= 18 NO. EXP.= 19     NO.>=MED.= 21 NO. EXP.= 20   CHI-SQ.=   0.1 DF= 1 SIG.= 0.749
     LEVEL 4 NO.<MED.=  1 NO. EXP.=  1     NO.>=MED.=  2 NO. EXP.=  2   TEST CANNOT BE RUN; EXP. NO. < 3
     OVERALL CHI-SQ=   1.1 DF=  5  SIG.= 0.958

0    ISSUE GROUP =   3   ISSUE =   2   CSI DECOMP

     LEVEL 1 NO.<MED.= 17 NO. EXP.= 14     NO.>=MED.= 12 NO. EXP.= 15   CHI-SQ.=   1.2 DF= 1 SIG.= 0.255
     LEVEL 2 NO.<MED.= 24 NO. EXP.= 27     NO.>=MED.= 31 NO. EXP.= 28   CHI-SQ.=   0.7 DF= 1 SIG.= 0.418
     LEVEL 3 NO.<MED.= 25 NO. EXP.= 25     NO.>=MED.= 26 NO. EXP.= 26   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 4 NO.<MED.=  8 NO. EXP.=  7     NO.>=MED.=  7 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605
     OVERALL CHI-SQ=   2.2 DF=  7  SIG.= 0.950

0    ISSUE GROUP =   3   ISSUE =   3   FRAC IN-VES RETENTION LEAKED, AT VB

     LEVEL 1 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  7 NO. EXP.=  7   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 2 NO.<MED.= 24 NO. EXP.= 29     NO.>=MED.= 34 NO. EXP.= 29   CHI-SQ.=   1.7 DF= 1 SIG.= 0.189
     LEVEL 3 NO.<MED.= 18 NO. EXP.= 18     NO.>=MED.= 18 NO. EXP.= 18   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 4 NO.<MED.= 22 NO. EXP.= 17     NO.>=MED.= 13 NO. EXP.= 18   CHI-SQ.=   2.9 DF= 1 SIG.= 0.091
     LEVEL 5 NO.<MED.=  3 NO. EXP.=  3     NO.>=MED.=  4 NO. EXP.=  4   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     OVERALL CHI-SQ=   4.6 DF=  9  SIG.= 0.869

0    ISSUE GROUP =   3   ISSUE =   4   S POOL DF

     LEVEL 1 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 2 NO.<MED.= 38 NO. EXP.= 38     NO.>=MED.= 38 NO. EXP.= 38   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 3 NO.<MED.= 14 NO. EXP.= 15     NO.>=MED.= 16 NO. EXP.= 15   CHI-SQ.=   0.1 DF= 1 SIG.= 0.715
     LEVEL 4 NO.<MED.= 12 NO. EXP.= 12     NO.>=MED.= 12 NO. EXP.= 12   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000
     LEVEL 5 NO.<MED.=  3 NO. EXP.=  2     NO.>=MED.=  2 NO. EXP.=  3   TEST CANNOT BE RUN; EXP. NO. < 3
     OVERALL CHI-SQ=   0.1 DF=  7  SIG.= 1.000

0    ISSUE GROUP =   3   ISSUE =   5   S POOL DF, VOL I
```

```
     LEVEL 1 NO.<MED.=  2 NO. EXP.=  2     NO.>=MED.=  2 NO. EXP.=  2   TEST CANNOT BE RUN; EXP. NO. < 3

     LEVEL 2 NO.<MED.= 21 NO. EXP.= 17     NO.>=MED.= 14 NO. EXP.= 18   CHI-SQ.=   1.8 DF= 1 SIG.= 0.176

     LEVEL 3 NO.<MED.= 23 NO. EXP.= 23     NO.>=MED.= 23 NO. EXP.= 23   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000

     LEVEL 4 NO.<MED.= 24 NO. EXP.= 25     NO.>=MED.= 26 NO. EXP.= 25   CHI-SQ.=   0.1 DF= 1 SIG.= 0.777

     LEVEL 5 NO.<MED.=  4 NO. EXP.=  7     NO.>=MED.= 11 NO. EXP.=  8   CHI-SQ.=   2.4 DF= 1 SIG.= 0.120

     OVERALL CHI-SQ=   4.3 DF=  7  SIG.= 0.742

0    ISSUE GROUP =   3   ISSUE =   6   REVOL FROM RPV (FRVOL)

     LEVEL 1 NO.<MED.=  2 NO. EXP.=  2     NO.>=MED.=  2 NO. EXP.=  2   TEST CANNOT BE RUN; EXP. NO. < 3

     LEVEL 2 NO.<MED.= 26 NO. EXP.= 23     NO.>=MED.= 21 NO. EXP.= 24   CHI-SQ.=   0.8 DF= 1 SIG.= 0.381

     LEVEL 3 NO.<MED.= 38 NO. EXP.= 38     NO.>=MED.= 38 NO. EXP.= 38   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000

     LEVEL 4 NO.<MED.=  8 NO. EXP.= 11     NO.>=MED.= 15 NO. EXP.= 12   CHI-SQ.=   1.6 DF= 1 SIG.= 0.210

     OVERALL CHI-SQ=   2.3 DF=  5  SIG.= 0.801

0    ISSUE GROUP =   3   ISSUE =   7   CCI REL

     LEVEL 1 NO.<MED.= 12 NO. EXP.=  9     NO.>=MED.=  6 NO. EXP.=  9   CHI-SQ.=   2.0 DF= 1 SIG.= 0.157

     LEVEL 2 NO.<MED.= 29 NO. EXP.= 31     NO.>=MED.= 33 NO. EXP.= 31   CHI-SQ.=   0.3 DF= 1 SIG.= 0.611

     LEVEL 3 NO.<MED.= 27 NO. EXP.= 27     NO.>=MED.= 28 NO. EXP.= 28   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000

     LEVEL 4 NO.<MED.=  6 NO. EXP.=  7     NO.>=MED.=  9 NO. EXP.=  8   CHI-SQ.=   0.3 DF= 1 SIG.= 0.605

     OVERALL CHI-SQ=   2.5 DF=  7  SIG.= 0.925

0    ISSUE GROUP =   3   ISSUE =   8   RB DF

     LEVEL 1 NO.<MED.= 18 NO. EXP.= 12     NO.>=MED.=  7 NO. EXP.= 13   CHI-SQ.=   5.8 DF= 1 SIG.= 0.016

     LEVEL 2 NO.<MED.= 32 NO. EXP.= 29     NO.>=MED.= 26 NO. EXP.= 29   CHI-SQ.=   0.6 DF= 1 SIG.= 0.431

     LEVEL 3 NO.<MED.= 17 NO. EXP.= 26     NO.>=MED.= 35 NO. EXP.= 26   CHI-SQ.=   6.2 DF= 1 SIG.= 0.013

     LEVEL 4 NO.<MED.=  7 NO. EXP.=  7     NO.>=MED.=  8 NO. EXP.=  8   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000

     OVERALL CHI-SQ=  12.6 DF=  7  SIG.= 0.082

0    ISSUE GROUP =   3   ISSUE =   9   REF BAY DF

     LEVEL 1 NO.<MED.=  6 NO. EXP.=  6     NO.>=MED.=  6 NO. EXP.=  6   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000

     LEVEL 2 NO.<MED.= 13 NO. EXP.= 13     NO.>=MED.= 14 NO. EXP.= 14   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000

     LEVEL 3 NO.<MED.= 28 NO. EXP.= 28     NO.>=MED.= 29 NO. EXP.= 29   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000

     LEVEL 4 NO.<MED.= 27 NO. EXP.= 27     NO.>=MED.= 27 NO. EXP.= 27   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000

     OVERALL CHI-SQ=   0.0 DF=  7  SIG.= 1.000

0    ISSUE GROUP =   3   ISSUE =  10   LATE RELEASE FRACT, IODINE

     LEVEL 1 NO.<MED.=  4 NO. EXP.=  3     NO.>=MED.=  3 NO. EXP.=  4   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000

     LEVEL 2 NO.<MED.= 24 NO. EXP.= 24     NO.>=MED.= 25 NO. EXP.= 25   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000

     LEVEL 3 NO.<MED.= 36 NO. EXP.= 36     NO.>=MED.= 37 NO. EXP.= 37   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000

     LEVEL 4 NO.<MED.= 10 NO. EXP.= 10     NO.>=MED.= 11 NO. EXP.= 11   CHI-SQ.=   0.0 DF= 1 SIG.= 1.000

     OVERALL CHI-SQ=   0.0 DF=  7  SIG.= 1.000
```

```
CONSEQUENCE MEASURE:  EARLY FATALITIES

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.   1       1-TH FROM BOTTOM      SAMPLE MEMBER 125  RISK= 1.189E-09
     ISSUE LEVELS:   3 2 3 2 3    2 4 3 1 1    8 3 1 2 2    3 4 2 2 2    1 2 2 2 4    2 2 2 2 2    1 2 1 2 2
1 1

     SEQ.          FREQ.      CFM                           PROB.      REL  CONS.   CONTRIB.

     TB          1.57E-06                                                         1.19E-09
                              FCACCCGBFDBCCDDBBHABBB    0.0129    4  3.73E-03  7.58E-11
                              FCACCCGGEDBCBABBDEABBB    0.2820    3  1.84E-03  8.16E-10
                              FCBBAAGCFBBBCBBBHHABBB    0.0256    3  1.84E-03  7.41E-11
                              FCBBACGCFBBBCBBBHHABBB    0.0258    3  1.84E-03  7.48E-11
                              FCCBAAGCFBBBCBBBHHABBB    0.0512    3  1.84E-03  1.48E-10
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TB             1.00
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     FCACCCGBFDBCCDDBBHABBB       0.06
     FCACCCGGEDBCBABBDEABBD       0.69
     FCBBAAGCFBBBCBBBHHABBB       0.06
     FCBBACGCFBBBCBBBHHABBB       0.06
     FCCBAAGCFBBBCBBBHHABBB       0.12
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  3D        0.94
     PCH  4D        0.06
1    CONSEQUENCE MEASURE:  EARLY FATALITIES

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.   2       2-TH FROM BOTTOM      SAMPLE MEMBER 133  RISK= 2.869E-09
     ISSUE LEVELS:   3 2 2 1 3    3 3 2 3 1    5 3 2 2 2    1 2 3 2 2    2 2 2 1 4    2 4 3 2 2    4 1 2 2 2
3 4

     SEQ.          FREQ.      CFM                           PROB.      REL  CONS.   CONTRIB.

     TB          1.57E-06                                                         7.31E-10
                              FCACCCGGEDBCBABBGEABBB    0.2528    3  1.84E-03  7.31E-10

     TCSRX2      6.75E-07                                                         2.14E-09
                              CAACACBGFDACBCCBADABAB    0.0328   21  3.32E-03  7.35E-11
                              CAACACBGFDACBCCBAEABAB    0.0328   21  3.32E-03  7.35E-11
                              DAAAAAGBFABCCBBBHHABBB    0.3383   12  1.88E-04  4.29E-11
                              DAAAAAGGDDACBBBBAEABAB    0.0193   15  1.43E-02  1.86E-10
                              DAAAACGBFABCCBBBHHABBB    0.3383   19  3.69E-04  8.42E-11
                              DAAAACGGDDACBBBBAEABAB    0.0193   28  1.26E-01  1.64E-09
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TB             0.25
     TCSRX2         0.75
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     CAACACBGFDACBCCBADABAB       0.03
     CAACACBGFDACBCCBAEABAB       0.03
     DAAAAAGBFABCCBBBHHABBB       0.01
     DAAAAAGGDDACBBBBAEABAB       0.06
     DAAAACGBFABCCBBBHHABBB       0.03
     DAAAACGGDDACBBBBAEABAB       0.57
     FCACCCGGEDBCBABBGEABBB       0.25
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  3D        0.25
     PCH 12D        0.03
     PCH 15D        0.06
     PCH 19D        0.03
     PCH 21D        0.05
     PCH 28D        0.57
1    CONSEQUENCE MEASURE:  EARLY FATALITIES

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.   3       3-TH FROM BOTTOM      SAMPLE MEMBER   4  RISK= 5.652E-09
     ISSUE LEVELS:   2 2 2 1 1    2 3 3 4 1    6 3 2 2 2    1 2 1 2 2    2 2 2 2 2    2 4 3 3 2    2 2 1 2 4
```

```
5 7

     SEQ.          FREQ.      CFM                           PROB.      REL  CONS.  CONTRIB.

     TB            2.73E-07                                                        3.35E-10
                              FCACCCFGFDBCBABBGFABBB        0.0415      3  1.84E-03  2.09E-11
                              FCACCCGGEDBCBABBGFABBB        0.1238      4  3.73E-03  1.26E-10
                              FCBBAAGCFBBCCBBBHHABBB        0.0723      3  1.84E-03  3.62E-11
                              FCBBACGCFBBCCBBBHHABBB        0.0728      3  1.84E-03  3.65E-11
                              FCCBAAGCFBBBCBBBHHABBB        0.0854      3  1.84E-03  4.28E-11
                              FCCBAAGCFBBCCBBBHHABBB        0.1443      3  1.84E-03  7.24E-11

     TCSX          6.93E-08                                                        2.57E-10
                              BAACACGGDAACBABBDDABBB        0.0320     31  1.16E-01  2.57E-10

     TCSRV23       2.02E-08                                                        5.06E-09
                              DABAACGADDACBBBBBGABAB        0.1843     41  4.14E-01  1.54E-09
                              DACAAAGADABCCBBBHHABBB        0.3793     29  4.59E-01  3.52E-09
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TB                0.06
     TCSX              0.05
     TCSRV23           0.90
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     BAACACGGDAACBABBODABBB         0.05
     DABAACGADDACBBBBBGABAB         0.27
     DACAAAGADABCCBBBHHABBB         0.62
     FCACCCGGEDBCBABBGFABBB         0.02
     FCCBAAGCFBBCCBBBHHABBB         0.01
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  3D           0.04
     PCH  4D           0.02
     PCH 29D           0.62
     PCH 31D           0.05
     PCH 41D           0.27
1    CONSEQUENCE MEASURE:  EARLY FATALITIES

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.  4       4-TH FROM BOTTOM      SAMPLE MEMBER 138  RISK= 5.817E-09
     ISSUE LEVELS:   3 3 2 2 3    3 3 1 1 1    9 3 2 1 1    1 3 2 2 1    2 2 1 3 2    3 4 2 2 1    2 1 1 3 3
1 8

     SEQ.          FREQ.      CFM                           PROB.      REL  CONS.  CONTRIB.

     TB            1.57E-06                                                        1.28E-09
                              FCACCCGGDDBCBABBGABABB        0.0683      5  1.19E-02  1.28E-09

     TBUX          2.69E-06                                                        4.54E-09
                              EBACCCGGDDBCBABBFABABB        0.1238      5  1.19E-02  3.96E-09
                              EBACCCGGEDBCBABBFBBABB        0.1165      3  1.84E-03  5.77E-10
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TB                0.22
     TBUX              0.78
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     EBACCCGGDDBCBABBFABABB         0.68
     EBACCCGGEDBCBABBFBBABB         0.10
     FCACCCGGDDBCBABBGABABB         0.22
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  3D           0.10
     PCH  5D           0.90
1    CONSEQUENCE MEASURE:  EARLY FATALITIES

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.  5       5-TH FROM BOTTOM      SAMPLE MEMBER  31  RISK= 5.918E-09
     ISSUE LEVELS:   3 3 3 1 1    1 2 2 3 1    4 3 2 1 2    2 2 2 2 1    2 2 3 1 2    2 2 3 1 2    4 3 1 2 1
2 1

     SEQ.          FREQ.      CFM                           PROB.      REL  CONS.  CONTRIB.

     TBUX          2.24E-06                                                        5.78E-09
                              EBACCCFGFDBCBABBFEABBB        0.3193      4  3.73E-03  2.67E-09
```

```
                                 EBACCCGEFDBCCABBFEABBB     0.0534    3  1.04E-03  2.20E-10
                                 EBACCCGGEDBCBABBFEABBB     0.1084    5  1.19E-02  2.09E-09

      TCSRV23     7.40E-08                                                         1.39E-10
                                 DABAACGADDACBBBBHGABAB     0.4709   24  3.98E-03  1.39E-10
0     EARLY FATALITIES

      FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
      TBUX            0.98
      TCSRV23         0.02
0     EARLY FATALITIES

      FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
      DABAACGADDACBBBBHGABAB      0.02
      EBACCCFGFDBCBABBFEABBB      0.45
      EBACCCGEFDBCCABBFEABBB      0.04
      EBACCCGGEDBCBABBFEABBB      0.49
0     EARLY FATALITIES

      FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
      PCH  3D         0.04
      PCH  4D         0.45
      PCH  5D         0.49
      PCH 24D         0.02
1     CONSEQUENCE MEASURE:  EARLY FATALITIES

      DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


      SELECTION NO.   6       6-TH FROM BOTTOM     SAMPLE MEMBER 104  RISK= 6.308E-09
      ISSUE LEVELS:   2 1 2 2 1   4 1 3 3 1   3 3 1 2 2   2 2 2 2 1   2 2 1 2 2   3 4 3 2 1   4 3 2 3 1
3 2

      SEQ.         FREQ.       CFM                          PROB.     REL  CONS.  CONTRIB.

      TB          2.73E-07                                                         2.84E-10
                               FCACCCGGEDBCBABBEEABBB     0.1186    3  1.04E-03  5.95E-11
                               FCBBAAGCFBBCCBBBHHABBB     0.1117    3  1.04E-03  5.60E-11
                               FCBBACGCFBBCCBBBHHABBB     0.1126    3  1.04E-03  5.65E-11
                               FCCBAAGCFBBCCBBBHHABBB     0.2233    3  1.04E-03  1.12E-10

      TCSX        6.93E-08                                                         1.17E-10
                               BAACAAGBFAACCBBBHHABBB     0.4570   19  3.69E-04  1.17E-11
                               BAACACGBFAACCBBBHHABBB     0.4570   21  3.32E-03  1.05E-10

      TCSRX2      2.02E-07                                                         5.91E-09
                               CAACAABGFDACBCCBADABAB     0.1251   15  1.43E-02  3.62E-10
                               CAACAABGFDACBCCBAEABAB     0.1251   15  1.43E-02  3.62E-10
                               CAACACBGFDACBCCBADABAB     0.0682   28  1.26E-01  1.74E-09
                               CAACACBGFDACBCCBAEABAB     0.0682   28  1.26E-01  1.74E-09
                               CAACACBGFDACBCDBAEABAB     0.0569   28  1.26E-01  1.45E-09
                               DAAAACGBFDACCBBBHHABBB     0.3240   24  3.98E-03  2.61E-10
0     EARLY FATALITIES

      FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
      TB              0.05
      TCSX            0.02
      TCSRX2          0.94
0     EARLY FATALITIES

      FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
      BAACACGBFAACCBBBHHABBB      0.02
      CAACAABGFDACBCCBADABAB      0.06
      CAACAABGFDACBCCBAEABAB      0.06
      CAACACBGFDACBCCBADABAB      0.28
      CAACACBGFDACBCCBAEABAB      0.28
      CAACACBGFDACBCDBAEABAB      0.23
      DAAAACGBFDACCBBBHHABBB      0.04
      FCCBAAGCFBBCCBBBHHABBB      0.02
0     EARLY FATALITIES

      FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
      PCH  3D         0.05
      PCH 15D         0.11
      PCH 21D         0.02
      PCH 24D         0.04
      PCH 28D         0.78
1     CONSEQUENCE MEASURE:  EARLY FATALITIES

      DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


      SELECTION NO.   7       7-TH FROM BOTTOM     SAMPLE MEMBER  66  RISK= 7.249E-09
      ISSUE LEVELS:   3 3 2 1 1   2 3 3 2 1   6 2 2 1 2   2 2 2 2 2   2 2 2 4 3   2 4 4 1 1   1 2 1 2 3
4 6
```

```
       SEQ.         FREQ.      CFM                             PROB.     REL  CONS.   CONTRIB.

       TBUX         2.24E-06                                                          7.25E-09
                               EBACBBGEFCBCCABBFEABBA         0.0923     3  1.84E-03  3.81E-10
                               EBACCCFGFDBCBABBFEABBB         0.1112     3  1.84E-03  4.50E-10
                               EBACCCFGFDBCBACBFEABBB         0.0221     4  3.73E-03  1.84E-10
                               EBACCCFGFDBCBADBFEABBB         0.1986     5  1.19E-02  5.30E-09
                               EBACCCGGEDBCBABBFEABBB         0.1112     4  3.73E-03  9.29E-10
 0     EARLY FATALITIES

       FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
       TBUX            1.00
 0     EARLY FATALITIES

       FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
       EBACBFGEFCBCCABBFEABBA         0.05
       EBACCCFGFDBCBABBFEABBB         0.06
       EBACCCFGFDBCBACBFEABBB         0.03
       EBACCCFGFDBCBADBFEABBB         0.73
       EBACCCGGEDBCBABBFEABBB         0.13
 0     EARLY FATALITIES

       FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
       PCH  3D         0.12
       PCH  4D         0.15
       PCH  5D         0.73
 1     CONSEQUENCE MEASURE:  EARLY FATALITIES

       DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS

       SELECTION NO.   8      8-TH FROM BOTTOM     SAMPLE MEMBER  17  RISK= 7.686E-09
       ISSUE LEVELS:   2 2 3 1 1    3 2 3 2 1    6 2 2 2 1    3 5 2 1 1    1 2 2 3 5    4 3 3 1 2    4 2 2 3 1
 5 2

       SEQ.         FREQ.      CFM                             PROB.     REL  CONS.   CONTRIB.

       TB           2.73E-07                                                          9.68E-10
                               FCACCCGGDDBCBABBDABABB         0.0245     5  1.19E-02  7.96E-11
                               FCACCCGGDDBCBABBDBBABB         0.1212     5  1.19E-02  3.93E-10
                               FCBBAAGCDBBCBBBBHHABBB         0.1088     4  3.73E-03  1.11E-10
                               FCBBACGCDBBCBBBBHHABBB         0.1096     4  3.73E-03  1.11E-10
                               FCBBACGGDDBCBABBEGABBB         0.1027     3  1.84E-03  5.15E-11
                               FCCBAAGCFBBCCBBBHHABBB         0.2175     4  3.73E-03  2.21E-10

       TBUX         3.16E-08                                                          1.70E-10
                               EBACCCGGDDBCBABBFBBABB         0.4737     5  1.19E-02  1.70E-10

       TBU          6.37E-08                                                          2.71E-10
                               EBAACCGGDDBCBABBEHBBBB         0.3578     5  1.19E-02  2.71E-10

       TCSX         6.93E-08                                                          9.16E-11
                               BAACACGBDAACBBBBHHABBB         0.3323    24  3.98E-03  9.16E-11

       TCSRV23      2.22E-08                                                          6.14E-09
                               DABAAAGADDACBBBBHGABAB         0.4137    29  4.59E-01  4.21E-09
                               DABAACGADDACBBBBHGABAB         0.4137    37  2.11E-01  1.93E-09
 0     EARLY FATALITIES

       FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
       TB              0.13
       TBUX            0.02
       TBU             0.04
       TCSX            0.01
       TCSRV23         0.80
 0     EARLY FATALITIES

       FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
       BAACACGBDAACBBBBHHABBB         0.01
       DABAAAGADDACBBBBHGABAB         0.55
       DABAACGADDACBBBBHGABAB         0.25
       EBAACCGGDDBCBABBEHBBBB         0.04
       EBACCCGGDDBCBABBFBBABB         0.02
       FCACCCGGDDBCBABBDABABB         0.01
       FCACCCGGDDBCBABBDBBABB         0.05
       FCBBAAGCDBBCBBBBHHABBB         0.01
       FCBBACGCDBBCBBBBHHABBB         0.01
       FCCBAAGCFBBCCBBBHHABBB         0.03
 0     EARLY FATALITIES

       FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
       PCH  4D         0.06
       PCH  5D         0.12
       PCH 24D         0.01
       PCH 29D         0.55
       PCH 37D         0.25
```

```
1     CONSEQUENCE MEASURE:  EARLY FATALITIES

      DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


      SELECTION NO.   9      9-TH FROM BOTTOM     SAMPLE MEMBER 140  RISK= 1.071E-08
      ISSUE LEVELS:   2 3 1 1 3    3 3 4 3 2    5 2 2 1 2    3 3 2 1 2    2 2 3 2 4    2 3 3 2 1    3 2 1 3 4
2 4

      SEQ.          FREQ.      CFM                          PROB.      REL  CONS.   CONTRIB.

      TB          1.57E-06                                                          2.76E-09
                               FCACCCGGDDBCBABBDEABBB       0.4007     4  3.73E-03  2.35E-09
                               FCCBAAGCFBBCCBBBHHABBB       0.1409     3  1.84E-03  4.08E-10

      TBUX        2.69E-06                                                          7.95E-09
                               EBACCCGGDDBBBABBFEABBB       0.0490     4  3.73E-03  4.91E-10
                               EBACCCGGDDBCBABBFEABBB       0.7433     4  3.73E-03  7.46E-09
0     EARLY FATALITIES

      FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
      TB              0.26
      TBUX            0.74
0     EARLY FATALITIES

      FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
      EBACCCGGDDBBBABBFEABBB      0.05
      EBACCCGGDDBCBABBFEABBB      0.70
      FCACCCGGDDBCBABBDEABBB      0.22
      FCCBAAGCFBBCCBBBHHABBB      0.04
0     EARLY FATALITIES

      FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
      PCH  3D         0.04
      PCH  4D         0.96
1     CONSEQUENCE MEASURE:  EARLY FATALITIES

      DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


      SELECTION NO.  10      10-TH FROM BOTTOM     SAMPLE MEMBER  81  RISK= 1.092E-08
      ISSUE LEVELS:   2 2 2 1 4    2 2 3 2 1    7 3 2 1 2    1 1 2 2 2    1 2 2 3 4    2 3 3 3 2    4 4 2 1 1
5 1

      SEQ.          FREQ.      CFM                          PROB.      REL  CONS.   CONTRIB.

      TB          3.32E-06                                                          1.09E-08
                               FCACCCGEFDBCCABBGFABBB       0.0205     4  3.73E-03  2.54E-10
                               FCACCCGGEDBCBABBGFABBB       0.1504     4  3.73E-03  1.86E-09
                               FCBBAAGCFBBBCBBBHHABBB       0.0176     5  1.19E-02  6.95E-10
                               FCBBAAGCFBBCCBBBHHABBB       0.0299     5  1.19E-02  1.18E-09
                               FCBBACGCFBBBCBBBHHABBB       0.0178     5  1.19E-02  7.01E-10
                               FCBBACGCFBBCCBBBHHABBB       0.0301     5  1.19E-02  1.19E-09
                               FCBBACGCFBBCCBBBHHBBBB       0.0118     5  1.19E-02  4.66E-10
                               FCBBACGEFBBBCABBEGABBB       0.0248     4  3.73E-03  3.06E-10
                               FCBBACGEFBBCCABBEGABBB       0.0420     4  3.73E-03  5.20E-10
                               FCCBAAGCFBBBCBBBHHABBB       0.0352     5  1.19E-02  1.39E-09
                               FCCBAAGCFBBCCBBBHHABBB       0.0597     5  1.19E-02  2.36E-09
0     EARLY FATALITIES

      FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
      TB              1.00
0     EARLY FATALITIES

      FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
      FCACCCGEFDBCCABBGFABBB      0.02
      FCACCCGGEDBCBABBGFABBB      0.17
      FCBBAAGCFBBBCBBBHHABBB      0.06
      FCBBAAGCFBBCCBBBHHABBB      0.11
      FCBBACGCFBBBCBBBHHABBB      0.06
      FCBBACGCFBBCCBBBHHABBB      0.11
      FCBBACGCFBBCCBBBHHBBBB      0.04
      FCBBACGEFBBBCABBEGABBB      0.03
      FCBBACGEFBBCCABBEGABBB      0.05
      FCCBAAGCFBBBCBBBHHABBB      0.13
      FCCBAAGCFBBCCBBBHHABBB      0.22
0     EARLY FATALITIES

      FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
      PCH  4D         0.27
      PCH  5D         0.73
1     CONSEQUENCE MEASURE:  EARLY FATALITIES

      DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS
```

344

```
     SELECTION NO.  11     141-TH FROM BOTTOM     SAMPLE MEMBER  22  RISK= 6.111E-06
     ISSUE LEVELS:    3 4 4 1 2    3 3 2 2 1    3 2 2 2 2    3 1 2 1 2    2 2 2 2 2    4 4 3 1 2    3 3 2 1 1
5 5

     SEQ.          FREQ.      CFM                           PROB.      REL  CONS.   CONTRIB.

     TBUX        3.50E-05                                                          6.06E-06
                              EBACCCGGDDBCBABBFFABBB        0.6179      6  2.79E-01  6.04E-06
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TBUX             0.99
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     EBACCCGGDDBCBABBFFABBB       0.99
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  6D          1.00
1    CONSEQUENCE MEASURE:  EARLY FATALITIES

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS

     SELECTION NO.  12     142-TH FROM BOTTOM     SAMPLE MEMBER  90  RISK= 6.206E-06
     ISSUE LEVELS:    3 4 3 1 2    2 2 2 3 1    6 3 2 2 2    3 5 1 1 2    1 2 2 2 4    2 5 3 2 2    3 4 2 2 2
2 7

     SEQ.          FREQ.      CFM                           PROB.      REL  CONS.   CONTRIB.

     TBUX        3.50E-05                                                          6.14E-06
                              EBACCCGGDDBCBABBFEABBB        0.6247      6  2.79E-01  6.11E-06
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TBUX             0.99
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     EBACCCGGDDBCBABBFEABBB       0.98
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  6D          0.99
1    CONSEQUENCE MEASURE:  EARLY FATALITIES

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS

     SELECTION NO.  13     143-TH FROM BOTTOM     SAMPLE MEMBER 115  RISK= 7.622E-06
     ISSUE LEVELS:    2 4 3 1 3    4 2 3 2 1    6 2 2 2 1    3 3 1 2 2    2 2 3 3 2    2 2 3 2 4    3 3 2 1 3
3 5

     SEQ.          FREQ.      CFM                           PROB.      REL  CONS.   CONTRIB.

     TB          1.57E-06                                                          3.58E-07
                              FCACCCGGDDBCBABBDCBABB        0.3299      8  6.91E-01  3.58E-07

     TBUX        3.72E-05                                                          7.26E-06
                              EBACCCFGFDBCBADBFCBABB        0.2563      5  1.19E-02  1.13E-07
                              EBACCCGGDDBCBABBFABABB        0.1225      8  6.91E-01  3.15E-06
                              EBACCCGGDDFCBABBFCBABB        0.0138      8  6.91E-01  3.54E-07
                              EBACCCGGEDBCBABBFCBABB        0.1435      7  6.27E-01  3.35E-06
                              EBACCCGGEDBCBABBFEBBBB        0.0194      6  2.79E-01  2.02E-07
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TB               0.05
     TBUX             0.95
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     EBACCCFGFDBCBADBFCBABB       0.01
     EBACCCGGDDBCBABBFABABB       0.41
     EBACCCGGDDBCBABBFCBABB       0.05
     EBACCCGGEDBCBABBFCBABB       0.44
     EBACCCGGEDBCBABBFEBBBB       0.03
     FCACCCGGDDBCBABBDCBABB       0.05
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  5D          0.03
     PCH  6D          0.03
     PCH  7D          0.44
     PCH  8D          0.51
```

```
1    CONSEQUENCE MEASURE:  EARLY FATALITIES

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.  14    144-TH FROM BOTTOM    SAMPLE MEMBER  53  RISK= 8.867E-06
     ISSUE LEVELS:   1 4 3 2 1   3 2 3 3 1   9 2 2 1 1   2 2 1 1 2   2 2 2 1 4   3 4 2 2 3   4 3 2 3 2
4 5

     SEQ.          FREQ.      CFM                          PROB.     REL  CONS.  CONTRIB.

     TBUX        3.10E-05                                                          8.87E-06
                              EBACCCGGDDBCBABBFABABB       0.0688     7  6.27E-01  1.34E-06
                              EBACCCGGDDBCBABBFCBABB       0.3396     7  6.27E-01  6.60E-06
                              EBACCCGGDDBCBABBFFBBBB       0.0450     7  6.27E-01  8.73E-07
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TBUX           1.00
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     EBACCCGGDDBCBABBFABABB       0.15
     EBACCCGGDDBCBABBFCBABB       0.74
     EBACCCGGDDBCBABBFFBBBB       0.10
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  7D           0.99
1    CONSEQUENCE MEASURE:  EARLY FATALITIES

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.  15    145-TH FROM BOTTOM    SAMPLE MEMBER  34  RISK= 1.109E-05
     ISSUE LEVELS:   4 4 3 2 1   2 4 3 2 1   5 1 2 1 1   2 1 2 1 2   1 2 1 2 3   2 2 4 4 2   3 2 2 3 1
5 7

     SEQ.          FREQ.      CFM                          PROB.     REL  CONS.  CONTRIB.

     TBUX        3.10E-05                                                          1.10E-05
                              EBACBBGGDCBCBABBFBBABA       0.0686     6  2.79E-01  5.93E-07
                              EBACBCGGDCBCBABBFBBABA       0.0685     6  2.79E-01  5.92E-07
                              EBACBCGGDCBCBABBFFBBBA       0.0163     6  2.79E-01  1.41E-07
                              EBACCCGGDDBCBABBFABABB       0.0686     8  6.91E-01  1.47E-06
                              EBACCCGGDDBCBABBFBBABB       0.3386     8  6.91E-01  7.25E-06
                              EBACCCGGDDBCBABBFFBBBB       0.0448     8  6.91E-01  9.60E-07
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TBUX           0.99
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     EBACBBGGDCBCBABBFBBABA       0.05
     EBACBCGGDCBCBABBFBBABA       0.05
     EBACBCGGDCBCBABBFFBBBA       0.01
     EBACCCGGDDBCBABBFABABB       0.13
     EBACCCGGDDBCBABBFBBABB       0.65
     EBACCCGGDDBCBABBFFBBBB       0.09
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  6D           0.12
     PCH  8D           0.88
1    CONSEQUENCE MEASURE:  EARLY FATALITIES

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.  16    146-TH FROM BOTTOM    SAMPLE MEMBER 120  RISK= 1.456E-05
     ISSUE LEVELS:   3 4 3 1 4   3 3 1 3 2   6 2 2 1 1   2 4 1 2 2   1 1 2 2 2   3 4 3 2 4   4 4 2 1 3
2 1

     SEQ.          FREQ.      CFM                          PROB.     REL  CONS.  CONTRIB.

     TB          3.32E-06                                                          8.50E-07
                              FCACCCGGDDBCBADBECBABB       0.3708     8  6.91E-01  8.50E-07

     TBUX        3.72E-05                                                          1.37E-05
                              EBACCCFGFDBBBADBFCBABB       0.0227     6  2.79E-01  2.36E-07
                              EBACCCFGFDBCBACBFCBABB       0.0239     6  2.79E-01  2.48E-07
                              EBACCCFGFDBCBADBFCBABB       0.3453     6  2.79E-01  3.58E-06
                              EBACCCGEFDBCCADBFCBABB       0.1820     6  2.79E-01  1.89E-06
                              EBACCCGEFDBCCADBFEBBBB       0.0247     6  2.79E-01  2.56E-07
                              EBACCCGGDDBBBADBFABABB       0.0093     8  6.91E-01  2.39E-07
```

```
                          EBACCCGGDDBCBADBFABABB    0.1411    8  6.91E-01  3.63E-06
                          EBACCCGGDDBCBADBFCBABB    0.0159    8  6.91E-01  4.09E-07
                          EBACCCGGEDBCBADBFCBABB    0.1298    7  6.27E-01  3.03E-06
                          EBACCCGGEDBCBADBFEBBBB    0.0176    6  2.79E-01  1.82E-07
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TB             0.06
     TBUX           0.94
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     EBACCCFGFDBBBADBFCBABB       0.02
     EBACCCFGFDBCBACBFCBABB       0.02
     EBACCCFGFDBCBADBFCBABB       0.25
     EBACCCGEFDBCCADBFCBABB       0.13
     EBACCCGEFDBCCADBFEBBBB       0.02
     EBACCCGGDDBBBADBFABABB       0.02
     EBACCCGGDDBCBADBFABABB       0.25
     EBACCCGGDDBCBADBFCBABB       0.03
     EBACCCGGEDBCBADBFCBABB       0.21
     EBACCCGGEDBCBADBFCBBBB       0.01
     FCACCCGGDDBCBADBECBABB       0.06
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  6D        0.44
     PCH  7D        0.21
     PCH  8D        0.35
1    CONSEQUENCE MEASURE:  EARLY FATALITIES

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.  17     147-TH FROM BOTTOM     SAMPLE MEMBER  74  RISK= 1.533E-05
     ISSUE LEVELS:   4 4 3 2 2    3 2 2 2 1    6 3 2 1 1    2 3 2 1 2    1 2 3 2 4    2 2 3 3 3    3 3 2 1 3
2 8

     SEQ.          FREQ.      CFM                          PROB.     REL  CONS.  CONTRIB.

     TBUX        3.50E-05                                                        1.50E-05
                          EBACCCGGDDBCBABBFABABB    0.0937    8  6.91E-01  2.27E-06
                          EBACCCGGDDBCBABBFBBABB    0.4629    8  6.91E-01  1.12E-05
                          EBACCCGGDDBCBABBFEBBBB    0.0613    8  6.91E-01  1.48E-06
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TBUX           0.98
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     EBACCCGGDDBCBABBFABABB       0.15
     EBACCCGGDDBCBABBFBBABB       0.73
     EBACCCGGDDBCBABBFEBBBB       0.10
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  8D        0.98
     PCH 36D        0.01
1    CONSEQUENCE MEASURE:  EARLY FATALITIES

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.  18     148-TH FROM BOTTOM     SAMPLE MEMBER  28  RISK= 1.852E-05
     ISSUE LEVELS:   3 4 2 2 3    2 2 3 2 1    3 3 2 2 1    2 5 3 2 1    2 2 3 2 2    2 4 3 2 3    3 4 2 1 3
5 2

     SEQ.          FREQ.      CFM                          PROB.     REL  CONS.  CONTRIB.

     TB          1.57E-06                                                        4.33E-07
                          FCACCCGGDDBCBABBEBBABB    0.3985    8  6.91E-01  4.33E-07

     TBUX        3.72E-05                                                        1.81E-05
                          EBACCCGGDDBCBABBFABABB    0.1192    7  6.27E-01  2.78E-06
                          EBACCCGGDDBCBABBFBBABB    0.5884    7  6.27E-01  1.37E-05
                          EBACCCGGDDBCBABBFCBBBB    0.0390    7  6.27E-01  9.08E-07
                          EBACCCGGEDBCBABBFCBBBB    0.0282    7  6.27E-01  6.58E-07
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TB             0.02
     TBUX           0.98
0    EARLY FATALITIES

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
```

```
      EBACCCGGDDBCBABBFABABB       0.15
      EBACCCGGDDBCBABBFBBABB       0.74
      EBACCCGGDDBCBABBFCBBBB       0.05
      EBACCCGGEDBCBABBFCBBBB       0.04
      FCACCCGGDDBCBABBEBBABB       0.02
0     EARLY FATALITIES

      FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
      PCH  7D          0.98
      PCH  8D          0.02
1     CONSEQUENCE MEASURE:  EARLY FATALITIES

      DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


      SELECTION NO.  19     149-TH FROM BOTTOM     SAMPLE MEMBER 149  RISK= 2.099E-05
      ISSUE LEVELS:   2 4 3 1 3    4 1 2 3 1    6 2 2 2 1    3 2 3 1 2    1 2 1 2 2    2 5 3 3 2    3 4 1 3 2
1 7

      SEQ.         FREQ.      CFM                          PROB.     REL  CONS.   CONTRIB.

      TB          1.57E-06                                                      4.42E-07
                              FCACCCGGDDBCBABBDBBABB       0.4064    8  6.91E-01  4.42E-07

      TBUX        3.72E-05                                                      2.05E-05
                              EBACBCGGDCBCBABBFBBABA       0.0264    6  2.79E-01  2.74E-07
                              EBACCCGGDDBCBABBFABABB       0.1196    8  6.91E-01  3.07E-06
                              EBACCCGGDDBCBABBFBBABB       0.5907    8  6.91E-01  1.52E-05
                              EBACCCGGDDBCBABBFEBBBB       0.0782    8  6.91E-01  2.01E-06
0     EARLY FATALITIES

      FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
      TB               0.02
      TBUX             0.98
0     EARLY FATALITIES

      FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
      EBACBCGGDCBCBABBFBBABA       0.01
      EBACCCGGDDBCBABBFABABB       0.15
      EBACCCGGDDBCBABBFBBABB       0.72
      EBACCCGGDDBCBABBFEBBBB       0.10
      FCACCCGGDDBCBABBDBBABB       0.02
0     EARLY FATALITIES

      FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
      PCH  6D          0.01
      PCH  8D          0.99
1     CONSEQUENCE MEASURE:  EARLY FATALITIES

      DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


      SELECTION NO.  20     150-TH FROM BOTTOM     SAMPLE MEMBER  20  RISK= 4.272E-05
      ISSUE LEVELS:   2 4 2 1 2    3 4 4 3 1    5 3 2 1 1    3 1 2 1 1    1 1 1 2 3    4 4 2 4 3    3 3 1 1 2
1 8

      SEQ.         FREQ.      CFM                          PROB.     REL  CONS.   CONTRIB.

      TBUX        3.50E-05                                                      4.23E-05
                              EBACBBGGDCBCBABBFBBABA       0.0526    7  6.27E-01  1.15E-06
                              EBACBCGGDCBCBADBFBBABA       0.0525    7  6.27E-01  1.15E-06
                              EBACCCGGDDBCBADBFABABB       0.0936    9  1.85E+00  6.07E-06
                              EBACCCGGDDBCBADBFBBABB       0.4624    9  1.85E+00  3.00E-05
                              EBACCCGGDDBCBADBFFBBBB       0.0612    9  1.85E+00  3.97E-06
0     EARLY FATALITIES

      FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
      TBUX             0.99
0     EARLY FATALITIES

      FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
      EBACBBGGDCBCBABBFBBABA       0.03
      EBACBCGGDCBCBADBFBBABA       0.03
      EBACCCGGDDBCBADBFABABB       0.14
      EBACCCGGDDBCBADBFBBABB       0.70
      EBACCCGGDDBCBADBFFBBBB       0.09
0     EARLY FATALITIES

      FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
      PCH  7D          0.05
      PCH  9D          0.95
1    LATENT CANCERS

      DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS
```

```
     SELECTION NO.   1      1-TH FROM BOTTOM     SAMPLE MEMBER   4  RISK= 2.831E-05
     ISSUE LEVELS:   2 2 2 1 1   2 3 3 4 1   6 3 2 2 2   1 2 1 2 2   2 2 2 2 2   2 4 3 3 2   2 2 1 2 4
5 7

     SEQ.          FREQ.     CFM                           PROB.     REL  CONS.     CONTRIB.

     TB          2.73E-07                                                           1.91E-05
                             FCACCCFGFDBCBABBGFABBB        0.0415     3  1.35E+02  1.53E-06
                             FCACCCGGEDBCBABBGFABBB        0.1238     4  9.70E+01  3.27E-06
                             FCBBAAGCFBBCCBBBHHABBB        0.0723     3  1.35E+02  2.66E-06
                             FCBBACGCFBBCCBBBHHABBB        0.0728     3  1.35E+02  2.68E-06
                             FCBBACGEFBBBCABBEGABBB        0.0601     2  1.19E+01  1.95E-07
                             FCBBACGEFBBCCABBEGABBB        0.1015     2  1.19E+01  3.29E-07
                             FCCBAAGCFBBBCBBBHHABBB        0.0854     3  1.35E+02  3.14E-06
                             FCCBAAGCFBBCCBBBHHABBB        0.1443     3  1.35E+02  5.31E-06

     TCSX        6.93E-08                                                           1.82E-06
                             BAACAAGBFABCCBBBHHABBB        0.3365    20  3.99E+01  9.30E-07
                             BAACACGGDAACBABBDDABBB        0.0320    31  4.01E+02  8.88E-07

     TCSRV23     2.02E-08                                                           7.37E-06
                             DABAACGADDACBBBBHGABAB        0.1843    41  1.73E+03  6.44E-06
                             DACAAAGADABCCBBBHHABBB        0.3793    29  1.21E+02  9.27E-07
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TB               0.68
     TCSX             0.06
     TCSRV23          0.26
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     BAACAAGBFABCCBBBHHABBB       0.03
     BAACACGGDAACBABBDDABBB       0.03
     DABAACGADDACBBBBHGABAB       0.23
     DACAAAGADABCCBBBHHABBB       0.03
     FCACCCFGFDBCBABBGFABBB       0.05
     FCACCCGGEDBCBABBGFABBB       0.12
     FCBBAAGCFBBCCBBBHHABBB       0.09
     FCBBACGCFBBCCBBBHHABBB       0.09
     FCBBACGEFBBCCABBEGABBB       0.01
     FCCBAAGCFBBBCBBBHHABBB       0.11
     FCCBAAGCFBBCCBBBHHABBB       0.19
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  2D          0.02
     PCH  3D          0.54
     PCH  4D          0.12
     PCH 20D          0.03
     PCH 29D          0.03
     PCH 31D          0.03
     PCH 41D          0.23
1    CONSEQUENCE MEASURE:  LATENT CANCERS

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.   2      2-TH FROM BOTTOM     SAMPLE MEMBER  17  RISK= 6.518E-05
     ISSUE LEVELS:   2 2 3 1 1   3 2 3 2 1   6 2 2 2 1   3 5 2 1 1   1 2 2 3 5   4 3 3 1 2   4 2 2 3 1
5 2

     SEQ.          FREQ.     CFM                           PROB.     REL  CONS.     CONTRIB.

     TB          2.73E-07                                                           3.24E-05
                             FCACCCGGDDBCBABBDABABB        0.0245     5  4.30E+02  2.88E-06
                             FCACCCGGDDBCBABBDBBABB        0.1212     5  4.30E+02  1.42E-05
                             FCBBAAGCDBBCBBBBHHABBB        0.1088     4  9.70E+01  2.88E-06
                             FCBBACGCDBBCBBBBHHABBB        0.1096     4  9.70E+01  2.90E-06
                             FCBBACGGDBBCBABBEGABBB        0.1027     3  1.35E+02  3.78E-06
                             FCCBAAGCFBBCCBBBHHABBB        0.2175     4  9.70E+01  5.75E-06

     TBUX        3.16E-08                                                           6.44E-06
                             EBACCCGGDDBCBABBFBBABB        0.4737     5  4.30E+02  6.44E-06

     TBU         6.37E-08                                                           9.80E-06
                             EBAACCGGDDBCBABBEHBBBB        0.3578     5  4.30E+02  9.80E-06

     TCSX        6.93E-08                                                           4.19E-06
                             BAACAAGBDAACBBBBHHABBB        0.3323    20  3.99E+01  9.19E-07
                             BAACACGBDAACBBBBHHABBB        0.3323    24  1.42E+02  3.27E-06

     TCUX        3.65E-07                                                           6.72E-06
                             AAACAAGGDABCBABBECABBB        0.2420    12  7.54E+00  6.66E-07
                             AAACACGGDABCBABBECABBB        0.2420    20  3.99E+01  3.52E-06
                             AABBAAGGDABCBABBDGABBB        0.0356    12  7.54E+00  9.81E-08
```

```
                              AABBAAGGDABCBABBFGABBB    0.0356   12  7.54E+00  9.80E-08
                              AABBACGGDABCBABBDGABBB    0.0832   20  3.99E+01  1.21E-06
                              AABBACGGDABCBABBDGBBBB    0.0235   20  3.99E+01  3.42E-07
                              AABBACGGDABCBABBFGABBB    0.0831   19  2.02E+01  6.12E-07
                              AABBACGGDABCBABBFGBBBB    0.0235   19  2.02E+01  1.73E-07

     TCSRV23     2.22E-08                                                      5.64E-06
                              DABAAAGADDACBBBBHGABAB    0.4137   29  1.21E+02  1.11E-06
                              DABAACGADDACBBBBHGABAB    0.4137   37  4.94E+02  4.53E-06
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TB              0.50
     TBUX            0.10
     TBU             0.15
     TCSX            0.06
     TCUX            0.10
     TCSRV23         0.09
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     AAACAAGGDABCBABBECABBB      0.01
     AAACACGGDABCBABBECABBB      0.05
     AABBACGGDABCBABBDGABBB      0.02
     BAACAAGBDAACBBBBHHABBB      0.01
     BAACACGBDAACBBBBHHABBB      0.05
     DABAAAGADDACBBBBHGABAB      0.02
     DABAACGADDACBBBBHGABAB      0.07
     EBAACCGGDDBCBABBEHBBBB      0.15
     EBACCCGGDDBCBABBFBBABB      0.10
     FCACCCGGDDBCBABBDABABB      0.04
     FCACCCGGDDBCBABBDBBABB      0.22
     FCBBAAGCDBBCBBBBHHABBB      0.04
     FCBBACGCDBBCBBBBHHABBB      0.04
     FCBBACGGDBBCBABBEGABBB      0.06
     FCCBAAGCFBBCCBBBHHABBB      0.09
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  3D         0.06
     PCH  4D         0.18
     PCH  5D         0.51
     PCH 12D         0.01
     PCH 19D         0.01
     PCH 20D         0.09
     PCH 24D         0.05
     PCH 29D         0.02
     PCH 37D         0.07
1    CONSEQUENCE MEASURE:  LATENT CANCERS

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.   3       3-TH FROM BOTTOM     SAMPLE MEMBER 104  RISK= 8.112E-05
     ISSUE LEVELS:   2 1 2 2 1    4 1 3 3 1    3 3 1 2 2    2 2 2 2 1    2 2 1 2 2    3 4 3 2 1    4 3 2 3 1
3 2

     SEQ.          FREQ.      CFM                       PROB.      REL  CONS.  CONTRIB.

     TB          2.73E-07                                                      2.13E-05
                              FCACCCGGEDBCBABBEEABBB    0.1186    3  1.35E+02  4.36E-06
                              FCBBAAGCFBBCCBBBHHABBB    0.1117    3  1.35E+02  4.11E-06
                              FCBBACGCFBBCCBBBHHABBB    0.1126    3  1.35E+02  4.14E-06
                              FCBBACGEFBBCCABBEGABBB    0.1571    2  1.19E+01  5.10E-07
                              FCCBAAGCFBBCCBBBHHABBB    0.2233    3  1.35E+02  8.22E-06

     TCSX        6.93E-08                                                      1.11E-05
                              BAACAAGBFAACCBBBHHABBB    0.4570   19  2.02E+01  6.40E-07
                              BAACACGBFAACCBBBHHABBB    0.4570   21  3.31E+02  1.05E-05

     TCUX        3.65E-07                                                      4.22E-06
                              AAACAADEEABCCABBEEABBB    0.1470    2  1.19E+01  6.38E-07
                              AAACAAGEFABCCABBEEABBB    0.0905    2  1.19E+01  3.93E-07
                              AAACACDEEABCCABBEBBABB    0.0197   13  3.11E+01  2.24E-07
                              AAACACDEEABCCABBEEABBB    0.1470   13  3.11E+01  1.67E-06
                              AAACACGEFABCCABBEEABBB    0.0905    2  1.19E+01  3.93E-07
                              AABBACGEFABCCABBDGABBB    0.0816    2  1.19E+01  3.54E-07
                              AABBACGEFABCCABBDGBBBB    0.0231    2  1.19E+01  1.00E-07
                              AABBACGEFABCCABBFGABBB    0.0815    2  1.19E+01  3.54E-07
                              AABBACGEFABCCABBFGBBBB    0.0230    2  1.19E+01  1.00E-07

     TCSRX2      2.02E-07                                                      4.44E-05
                              CAACAABGFDACBCCBADABAB    0.1251   15  2.10E+02  5.31E-06
                              CAACAABGFDACBCCBAEABAB    0.1251   15  2.10E+02  5.31E-06
                              CAACACBGFDACBCCBADABAB    0.0682   28  4.48E+02  6.18E-06
                              CAACACBGFDACBCCBAEABAB    0.0682   28  4.48E+02  6.18E-06
```

350

```
                              CAACACBGFDACBCDBAEABAB    0.0569  28  4.48E+02  5.15E-06
                              DAAAAAGBFDACCBBBHHABBB    0.3240  22  1.07E+02  7.01E-06
                              DAAAACGBFDACCBBBHHABBB    0.3240  24  1.42E+02  9.30E-06
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TB              0.26
     TCSX            0.14
     TCUX            0.05
     TCSRX2          0.55
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     AAACACDEEABCCABBEEABBB      0.02
     BAACACGBFAACCBBBHHABBB      0.13
     CAACAABGFDACBCCBADABAB      0.07
     CAACAABGFDACBCCBAEABAB      0.07
     CAACACBGFDACBCCBADABAB      0.08
     CAACACBGFDACBCCBAEABAB      0.08
     CAACACBGFDACBCDBAEABAB      0.06
     DAAAAAGBFDACCBBBHHABBB      0.09
     DAAAACGBFDACCBBBHHABBB      0.11
     FCACCCGGEDBCBABBEEABBB      0.05
     FCBBAAGCFBBCCBBBHHABBB      0.05
     FCBBACGCFBBCCBBBHHABBB      0.05
     FCCBAAGCFBBCCBBBHHABBB      0.10
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  2D         0.04
     PCH  3D         0.26
     PCH 13D         0.02
     PCH 15D         0.13
     PCH 21D         0.13
     PCH 22D         0.09
     PCH 24D         0.11
     PCH 28D         0.22
1    CONSEQUENCE MEASURE:  LATENT CANCERS

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.   4       4-TH FROM BOTTOM     SAMPLE MEMBER 133  RISK= 9.306E-05
     ISSUE LEVELS:   3 2 2 1 3    3 3 2 3 1    5 3 2 2 2    1 2 3 2 2    2 2 2 1 4    2 4 3 2 2    4 1 2 2 2
3 4

     SEQ.          FREQ.      CFM                       PROB.     REL  CONS.   CONTRIB.

     TB          1.57E-06                                                     5.79E-05
                              FCACCCFGFDBCBABBGEABBB    0.0858   2  1.19E+01  1.61E-06
                              FCACCCGEFDBCCABBGEABBB    0.0423   2  1.19E+01  7.92E-07
                              FCACCCGGEDBCBABBGEABBB    0.2528   3  1.35E+02  5.37E-05

     TCSRX2      6.75E-07                                                     3.52E-05
                              CAACACBGFDACBCCBADABAB    0.0328  21  3.31E+02  7.32E-06
                              CAACACBGFDACBCCBAEABAB    0.0328  21  3.31E+02  7.32E-06
                              DAAAAAGBFABCCBBBHHABBB    0.3383  12  7.54E+00  1.72E-06
                              DAAAAAGBFDACCBBBHHABBB    0.1557  12  7.54E+00  7.92E-07
                              DAAAAAGGDDACBBBBAEABAB    0.0193  15  2.10E+02  2.74E-06
                              DAAAACGBFABCCBBBHHABBB    0.3383  19  2.02E+01  4.61E-06
                              DAAAACGBFDACCBBBHHABBB    0.1557  20  3.99E+01  4.19E-06
                              DAAAACGGDDACBBBBAEABAB    0.0193  28  4.48E+02  5.84E-06
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TB              0.62
     TCSRX2          0.38
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     CAACACBGFDACBCCBADABAB      0.08
     CAACACBGFDACBCCBAEABAB      0.08
     DAAAAAGBFABCCBBBHHABBB      0.02
     DAAAAAGGDDACBBBBAEABAB      0.03
     DAAAACGBFABCCBBBHHABBB      0.05
     DAAAACGBFDACCBBBHHABBB      0.05
     DAAAACGGDDACBBBBAEABAB      0.06
     FCACCCFGFDBCBABBGEABBB      0.02
     FCACCCGGEDBCBABBGEABBB      0.58
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  1D         0.02
     PCH  2D         0.03
     PCH  3D         0.58
     PCH 12D         0.03
```

BEST COPY AVAILABLE

351

```
     PCH 15D          0.03
     PCH 19D          0.05
     PCH 20D          0.05
     PCH 21D          0.16
     PCH 28D          0.06
1    CONSEQUENCE MEASURE:  LATENT CANCERS

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.   5       5-TH FROM BOTTOM     SAMPLE MEMBER 107  RISK= 1.031E-04
     ISSUE LEVELS:   2 2 2 2 2    2 3 3 3 1    8 2 2 1 1    2 2 1 2 2    1 2 1 2 1    2 3 2 1 1    4 3 2 2 2
2 6

     SEQ.          FREQ.      CFM                        PROB.      REL  CONS.  CONTRIB.

     TB          7.39E-07                                                       8.75E-05
                              FCACCCFGFDBCBADBECBABB     0.0740      4  9.70E+01  5.31E-06
                              FCACCCGGDDBCBACBEABABB     0.0034      8  2.94E+03  7.29E-06
                              FCACCCGGDDBCBADBEABABB     0.0302      8  2.94E+03  6.56E-05
                              FCACCCGGEDBCBABBECBABB     0.0415      3  1.35E+02  4.13E-06
                              FCCBAAGCFBBCCBBBHHABBB     0.1067      2  1.19E+01  9.38E-07

     TBUX        3.58E-08                                                       1.11E-05
                              EBACCCFGFDBCBADBFCBABB     0.2384      4  9.70E+01  8.27E-07
                              EBACCCGGDDBCBADBFABABB     0.0973      8  2.94E+03  1.02E-05

     TCSRX2      2.02E-07                                                       4.53E-06
                              DAAAAAGBFABCCBBBHHABBB     0.4286     19  2.02E+01  1.75E-06
                              DAAAACGBFABCCBBBHHABBB     0.4286     18  3.21E+01  2.78E-06
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TB               0.85
     TBUX             0.11
     TCSRX2           0.04
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     DAAAAAGBFABCCBBBHHABBB       0.02
     DAAAACGBFABCCBBBHHABBB       0.03
     EBACCCGGDDBCBADBFABABB       0.10
     FCACCCFGFDBCBADBECBABB       0.05
     FCACCCGGDDBCBACBEABABB       0.07
     FCACCCGGDDBCBADBEABABB       0.64
     FCACCCGGEDBCBABBECBABB       0.04
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  2D          0.05
     PCH  3D          0.04
     PCH  4D          0.06
     PCH  8D          0.81
     PCH 18D          0.03
     PCH 19D          0.02
1    CONSEQUENCE MEASURE:  LATENT CANCERS

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.   6       6-TH FROM BOTTOM     SAMPLE MEMBER  69  RISK= 1.201E-04
     ISSUE LEVELS:   3 2 3 2 1    2 3 2 2 1    7 2 2 2 1    3 1 2 2 1    1 1 3 3 2    2 1 2 2 2    4 3 2 2 4
1 1

     SEQ.          FREQ.      CFM                        PROB.      REL  CONS.  CONTRIB.

     TB          2.73E-07                                                       4.21E-05
                              FCACCCGDFDBCBADBDBBABB     0.0370      7  1.52E+03  1.53E-05
                              FCACCCGDFDBCCADBDBBABB     0.0555      4  9.70E+01  1.47E-06
                              FCACCCGGDDBCBADBDABABB     0.0203      7  1.52E+03  8.41E-06
                              FCBBAAGCFBBCCDDBHHABBB     0.0682      3  1.35E+02  2.51E-06
                              FCBBACGCFBBBCDDBHHABBB     0.0407      4  9.70E+01  1.08E-06
                              FCBBACGCFBBCCDDBHHABBB     0.0688      3  1.35E+02  2.53E-06
                              FCBBACGEFBBCCADBEGABBB     0.0949      3  1.35E+02  3.49E-06
                              FCCBAAGCFBBBCDDBHHABBB     0.0806      4  9.70E+01  2.13E-06
                              FCCBAAGCFBBCCDDBHHABBB     0.1363      3  1.35E+02  5.02E-06

     TBUX        3.16E-0                                                        4.48E-06
                              EBACCCFGFDBCBADBFBBABB     0.2446      4  9.70E+01  7.51E-07
                              EBACCCGGDDBCBADBFABABB     0.0775      7  1.52E+03  3.73E-06

     TCSX        2.31E-07                                                       2.52E-05
                              BAACAAGBFAACCDDBHHABBB     0.0855     24  1.42E+02  2.81E-06
                              BAACAAGBFABCCDDBHHABBB     0.1858     24  1.42E+02  6.10E-06
                              BAACACGBFAACCDDBHHABBB     0.0855     24  1.42E+02  2.81E-06
                              BAACACGBFABCCDDBHHABBB     0.1858     24  1.42E+02  6.10E-06
```

```
                                 BABBACGEFABCCADBEGABBB    0.1259    3  1.35E+02  3.93E-06
                                 BACBAAGCFAACCDDBHHABBB    0.0468   22  1.07E+02  1.16E-06
                                 BACBAAGCFABCCDDBHHABBB    0.0915   22  1.07E+02  2.27E-06

      TCUX          3.54E-07                                                      3.50E-05
                                 AAACAAGDFABCBABBEBBABB    0.0077   24  1.42E+02  3.89E-07
                                 AAACAAGDFABCCABBEBBABB    0.0120   24  1.42E+02  6.03E-07
                                 AAACAAGEFABCCABBEEABBB    0.2396    3  1.35E+02  1.14E-05
                                 AAACACGDFABCBADBEBBABB    0.0077   24  1.42E+02  3.88E-07
                                 AAACACGDFABCCABBEBBABB    0.0120   24  1.42E+02  6.02E-07
                                 AAACACGEFABCCABBEEABBB    0.2396    3  1.35E+02  1.14E-05
                                 AABBACGEFABCCABBDGABBB    0.0824    3  1.35E+02  3.93E-06
                                 AABBACGEFABCCABBDGBBBB    0.0233    3  1.35E+02  1.11E-06
                                 AABBACGEFABCCABBFGABBB    0.0823    3  1.35E+02  3.93E-06
                                 AABBACGEFABCCABBFGBBBB    0.0233    3  1.35E+02  1.11E-06

      TCSRV23       7.40E-08                                                      1.33E-05
                                 DABAAAGADABCBDDBHGABAB    0.4243   29  1.21E+02  3.80E-06
                                 DABAACGADDACBDDBHGABAB    0.2062   33  3.31E+02  5.05E-06
                                 DACAAAGADABCCDDBHHABBB    0.4243   24  1.42E+02  4.46E-06
0     LATENT CANCERS

      FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
      TB                 0.35
      TBUX               0.04
      TCSX               0.21
      TCUX               0.29
      TCSRV23            0.11
0     LATENT CANCERS

      FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
      AAACAAGEFABCCABBEEABBB       0.10
      AAACACGEFABCCABBEEABBB       0.10
      AABBACGEFABCCABBDGABBB       0.03
      AABBACGEFABCCABBFGABBB       0.03
      BAACAAGBFAACCDDBHHABBB       0.02
      BAACAAGBFABCCDDBHHABBB       0.05
      BAACACGBFAACCDDBHHABBB       0.02
      BAACACGBFABCCDDBHHABBB       0.05
      BABBACGEFABCCADBEGABBB       0.03
      BACBAAGCFABCCDDBHHABBB       0.02
      DABAAAGADABCBDDBHGABAB       0.03
      DABAACGADDACBDDBHGABAB       0.04
      DACAAAGADABCCDDBHHABBB       0.04
      EBACCCGGDDBCBADBFABABB       0.03
      FCACCCGDFDBCBADBDBBABB       0.13
      FCACCCGDFDBCCADBDBBABB       0.01
      FCACCCGGDDBCBADBDABABB       0.07
      FCBBAAGCFBBCCDDBHHABBB       0.02
      FCBBACGCFBBCCDDBHHABBB       0.02
      FCBBACGEFBBCCADBEGABBB       0.03
      FCCBAAGCFBBBCDDBHHABBB       0.02
      FCCBAAGCFBBCCDDBHHABBB       0.04
0     LATENT CANCERS

      FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
      PCH  3D            0.42
      PCH  4D            0.05
      PCH  7D            0.23
      PCH 22D            0.03
      PCH 24D            0.20
      PCH 29D            0.03
      PCH 33D            0.04
1     CONSEQUENCE MEASURE:  LATENT CANCERS

      DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


      SELECTION NO.   7      7-TH FROM BOTTOM     SAMPLE MEMBER 125  RISK= 1.403E-04
      ISSUE LEVELS:   3 2 3 2 3   2 4 3 1 1   8 3 1 2 2   3 4 2 2 2   1 2 2 2 4   2 2 2 2 2   1 2 1 2 2
1 1

      SEQ.          FREQ.       CFM                         PROB.     REL  CONS.    CONTRIB.

      TB            1.57E-06                                                      9.20E-05
                                FCACCCGGFDBCBABBDEABBB     0.0940    2  1.19E+01  1.76E-06
                                FCACCCGBFDBCCDDBHHABBB     0.0129    4  9.70E+01  1.97E-06
                                FCACCCGGEDBCBABBDEABBB     0.2820    3  1.35E+02  5.99E-05
                                FCBBAAGCFBBBCBBBHHABBB     0.0256    3  1.35E+02  5.44E-06
                                FCBBACGCFBBBCBBBHHABBB     0.0258    3  1.35E+02  5.48E-06
                                FCBBACGEFBBCCABBEGABBB     0.0610    2  1.19E+01  1.14E-06
                                FCCBAAGCFBBBCBBBHHABBB     0.0512    3  1.35E+02  1.09E-05
                                FCCBAAGCFBBCCBBBHHABBB     0.0866    2  1.19E+01  1.62E-06

      TCSRX2        7.40E-07                                                      4.83E-05
                                DAAAAAGBFABCCBBBHHABBB     0.4433   20  3.99E+01  1.31E-05
```

```
                                 DAAAACGBFABCCBBBHHABBB    0.4433   22  1.07E+02  3.51E-05
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TB              0.66
     TCSRX2          0.34
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     DAAAAAGBFABCCBBBHHABBB      0.09
     DAAAACGBFABCCBBBHHABBB      0.25
     FCACCCFGFDBCBABBDEABBB      0.01
     FCACCCGBFDBCCDDBHHABBB      0.01
     FCACCCGGEDBCBABBDEABBB      0.43
     FCBBAAGCFBBBCBBBHHABBB      0.04
     FCBBACGCFBBCCBBBHHABBB      0.04
     FCCBAAGCFBBBCBBBHHABBB      0.08
     FCCBAAGCFBBCCBBBHHABBB      0.01
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  2D         0.06
     PCH  3D         0.58
     PCH  4D         0.01
     PCH 20D         0.09
     PCH 22D         0.25
1    CONSEQUENCE MEASURE:  LATENT CANCERS

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.   8      8-TH FROM BOTTOM     SAMPLE MEMBER  91  RISK= 1.802E-04
     ISSUE LEVELS:   2 2 2 1 2    2 2 3 3 1    9 2 2 2 1    2 4 2 2 2    2 2 1 2 4    5 4 2 2 2    4 3 2 2 1
3 1

     SEQ.         FREQ.      CFM                         PROB.      REL  CONS.   CONTRIB.

     TB          7.39E-07                                                        1.49E-04
                             FCACBCGEFCBCCABBEBBABA      0.0196     3  1.35E+02  1.96E-06
                             FCACCCFGFDBCBABBEBBABB      0.0410     3  1.35E+02  4.09E-06
                             FCACCCFGFDBCBADBEBBABB      0.0733     3  1.35E+02  7.32E-06
                             FCACCCGGDDBCBABBEABABB      0.0347     7  1.52E+03  3.90E-05
                             FCACCCGGDDBCBABBEBBABB      0.0024     7  1.52E+03  2.68E-06
                             FCACCCGGEDBCBABBEBBABB      0.0410     4  9.70E+01  2.94E-06
                             FCBBAAGCFBBBCBBBHHABBB      0.0317     5  4.30E+02  1.01E-05
                             FCBBAAGCFBBCCBBBHHABBB      0.0536     4  9.70E+01  3.84E-06
                             FCBBACGCFBBBCBBBHHABBB      0.0320     5  4.30E+02  1.02E-05
                             FCBBACGCFBBBCBBBHHBBBB      0.0125     5  4.30E+02  3.98E-06
                             FCBBACGCFBBCCBBBHHABBB      0.0540     4  9.70E+01  3.87E-06
                             FCBBACGCFBBCCBBBHHBBBB      0.0212     4  9.70E+01  1.52E-06
                             FCCBAAGCFBBBCBBBHHABBB      0.0634     5  4.30E+02  2.01E-05
                             FCCBAAGCFBBCCBBBHHABBB      0.1072     5  4.30E+02  3.41E-05

     TCSX        6.93E-08                                                        1.58E-05
                             BAACACGBFAACCBBBHHABBB      0.6015    23  3.80E+02  1.58E-05

     TCSRV23     2.02E-08                                                        1.49E-05
                             DABAACGADDACBBBBHGABAB      0.3974    41  1.73E+03  1.39E-05
                             DACAAAGADDACCBBBHHABBB      0.4183    29  1.21E+02  1.02E-06
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TB              0.83
     TCSX            0.09
     TCSRV23         0.08
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     BAACACGBFAACCBBBHHABBB      0.09
     DABAACGADDACBBBBHGABAB      0.08
     FCACBCGEFCBCCABBEBBABA      0.01
     FCACCCFGFDBCBABBEBBABB      0.02
     FCACCCFGFDBCBADBEBBABB      0.04
     FCACCCGGDDBCBABBEABABB      0.22
     FCACCCGGDDBCBABBEBBABB      0.01
     FCACCCGGEDBCBABBEBBABB      0.02
     FCBBAAGCFBBBCBBBHHABBB      0.06
     FCBBAAGCFBBCCBBBHHABBB      0.02
     FCBBACGCFBBBCBBBHHABBB      0.06
     FCBBACGCFBBBCBBBHHBBBB      0.02
     FCBBACGCFBBCCBBBHHABBB      0.02
     FCCBAAGCFBBBCBBBHHABBB      0.11
     FCCBAAGCFBBCCBBBHHABBB      0.19
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  3D         0.07
     PCH  4D         0.08
     PCH  5D         0.44
     PCH  7D         0.24
     PCH 23D         0.09
     PCH 41D         0.08
1    CONSEQUENCE MEASURE:  LATENT CANCERS

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.   9       9-TH FROM BOTTOM     SAMPLE MEMBER  18  RISK= 1.900E-04
     ISSUE LEVELS:   3 1 3 2 4   2 1 3 3 1   7 3 2 2 2   1 3 1 2 1   1 2 2 2 2   2 3 4 2 2   3 2 2 1 1
1 7

     SEQ.          FREQ.      CFM                         PROB.      REL  CONS.  CONTRIB.

     TB          3.32E-06                                                        1.84E-04
                              FCACCCFGFDBCBABBGEABBB      0.1514     2  1.19E+01  5.98E-06
                              FCACCCGEFDBCCABBGEABBB      0.0207     3  1.35E+02  9.25E-06
                              FCACCCGGEDBCBABBGEABBB      0.4518     4  9.70E+01  1.45E-04
                              FCCBAAGCFBBBCBBBHHABBB      0.0352     3  1.35E+02  1.57E-05
                              FCCBAAGCFBBCCBBBHHABBB      0.0597     2  1.19E+01  2.36E-06

     TCSRV23     7.40E-08                                                        6.33E-06
                              DABAACGADDACBBBBHGABAB      0.5250    29  1.21E+02  4.70E-06
                              DACAAAGADDACCBBBHHABBB      0.5526    20  3.99E+01  1.63E-06
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TB              0.97
     TCSRV23         0.03
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     DABAACGADDACBBBBHGABAB        0.02
     FCACCCFGFDBCBABBGEABBB        0.03
     FCACCCGEFDBCCABBGEABBB        0.05
     FCACCCGGEDBCB/.BBGEABBB       0.76
     FCCBAAGCFBBBCBBBHHABBB        0.08
     FCCBAAGCFBBCCBBBHHABBB        0.01
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  2D         0.07
     PCH  3D         0.13
     PCH  4D         0.76
     PCH 29D         0.02
1    CONSEQUENCE MEASURE:  LATENT CANCERS

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.  10      10-TH FROM BOTTOM     SAMPLE MEMBER  31  RISK= 2.133E-04
     ISSUE LEVELS:   3 3 3 1 1   1 2 2 3 1   4 3 2 1 2   2 2 2 2 1   2 2 3 1 2   2 2 3 1 2   4 3 1 2 1
2 1

     SEQ.          FREQ.      CFM                         PROB.      REL  CONS.  CONTRIB.

     TBUX        2.24E-06                                                        1.98E-04
                              EBACBBGEFCBCCABBFEABBA      0.0962     2  1.19E+01  2.56E-06
                              EBACBCGEFCBCCABBFEABBA      0.0962     2  1.19E+01  2.56E-06
                              EBACCCFGFDBCBABBFEABBB      0.3193     4  9.70E+01  6.94E-05
                              EBACCCGEFDBCCABBFEABBB      0.0534     3  1.35E+02  1.62E-05
                              EBACCCGGEDBCBABBFEABBB      0.1084     5  4.30E+02  1.04E-04

     TCSX        2.31E-07                                                        6.46E-06
                              BAACACGBFAACCBBBHHABBB      0.7000    20  3.99E+01  6.46E-06

     TCSRV23     7.40E-08                                                        8.87E-06
                              DABAACGADDACBBBBHGABAB      0.4709    24  1.42E+02  4.95E-06
                              DACAAAGADDACCBBBHHABBB      0.4957    22  1.07E+02  3.92E-06
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TBUX            0.93
     TCSX            0.03
     TCSRV23         0.04
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     BAACACGBFAACCBBBHHABBB        0.03
     DABAACGADDACBBBBHGABAB        0.02
     DACAAAGADDACCBBBHHABBB        0.02
     EBACBBGEFCBCCABBFEABBA        0.01
     EBACBCGEFCBCCABBFEABBA        0.01
     EBACCCFGFDBCBABBFEABBB      0.33
     EBACCCGEFDBCCABBFEABBB      0.08
     EBACCCGGEDBCBABBFEABBB      0.49
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  2D          0.04
     PCH  3D          0.08
     PCH  4D          0.33
     PCH  5D          0.49
     PCH 20D          0.03
     PCH 22D          0.02
     PCH 24D          0.02
1    CONSEQUENCE MEASURE:  LATENT CANCERS

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.  11     141-TH FROM BOTTOM     SAMPLE MEMBER  22  RISK= 2.234E-02
     ISSUE LEVELS:   3 4 4 1 2    3 3 2 2 1    3 2 2 2 2    3 1 2 1 2    2 2 2 2 2    4 4 3 1 2    3 3 2 1 1
5 5

     SEQ.          FREQ.      CFM                          PROB.      REL  CONS.  CONTRIB.

     TBUX        3.50E-05                                                      2.22E-02
                            EBACBBGGDCBCBABBFFABBA    0.0701    4  9.70E+01  2.38E-04
                            EBACBCGGDCBCBABBFFABBA    0.0701    4  9.70E+01  2.38E-04
                            EBACCCGGDDBCBABBFFABBB    0.6179    6  1.00E+03  2.16E-02
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TBUX             0.99
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     EBACBBGGDCBCBABBFFABBA      0.01
     EBACBCGGDCBCBABBFFABBA      0.01
     EBACCCGGDDBCBABBFFABBB      0.97
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  4D          0.02
     PCH  6D          0.98
1    CONSEQUENCE MEASURE:  LATENT CANCERS

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.  12     142-TH FROM BOTTOM     SAMPLE MEMBER  90  RISK= 2.343E-02
     ISSUE LEVELS:   3 4 3 1 2    2 2 2 3 1    6 3 2 2 2    3 5 1 1 2    1 2 2 2 4    2 5 3 2 2    3 4 2 2 2
2 7

     SEQ.          FREQ.      CFM                          PROB.      REL  CONS.  CONTRIB.

     TBUX        3.50E-05                                                      2.32E-02
                            EBACBBGGDCBCBABBFEABBA    0.0709    4  9.70E+01  2.41E-04
                            EBACBCGGDCBCBABBFEABBA    0.0709    5  4.30E+02  1.07E-03
                            EBACCCGGDDBCBABBFEABBB    0.6247    6  1.00E+03  2.19E-02
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TBUX             0.99
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     EBACBBGGDCBCBABBFEABBA      0.01
     EBACBCGGDCBCBABBFEABBA      0.05
     EBACCCGGDDBCBABBFEABBB      0.93
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  4D          0.01
     PCH  5D          0.05
     PCH  6D          0.94
1    CONSEQUENCE MEASURE:  LATENT CANCERS

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.  13     143-TH FROM BOTTOM     SAMPLE MEMBER  53  RISK= 2.386E-02
     ISSUE LEVELS:   1 4 3 2 1    3 2 3 3 1    9 2 2 1 1    2 2 1 1 2    2 2 2 1 4    3 4 2 2 3    4 3 2 3 2
4 5

     SEQ.          FREQ.      CFM                          PROB.      REL  CONS.  CONTRIB.

     TBUX        3.10E-05                                                      2.39E-02
```

356

```
                                   EBACBBGGDCBCBABBFCBABA     0.0688    5  4.30E+02  9.17E-04
                                   EBACBCGGDCBCBABBFCBABA     0.0687    5  4.30E+02  9.15E-04
                                   EBACCCGGDDBCBABBFABABB     0.0688    7  1.52E+03  3.24E-03
                                   EBACCCGGDDBCBABBFCBABB     0.3396    7  1.52E+03  1.60E-02
                                   EBACCCGGDDBCBABBFFBBBB     0.0450    7  1.52E+03  2.12E-03
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TBUX            1.00
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     EBACBBGGDCBCBABBFCBABA      0.04
     EBACDCGGDCBCBABBFCBABA      0.04
     EBACCCGGDDBCBABBFABABB      0.14
     EBACCCGGDDBCBABBFCBABB      0.67
     EBACCCGGDDBCBABBFFBBBB      0.09
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  3D         0.02
     PCH  5D         0.09
     PCH  7D         0.89
1    CONSEQUENCE MEASURE:  LATENT CANCERS

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.  14     144-TH FROM BOTTOM     SAMPLE MEMBER 115  RISK= 3.323E-02
     ISSUE LEVELS:   2 4 3 1 3   4 2 3 2 1   6 2 2 2 1   3 3 1 2 2   2 2 3 3 2   2 2 3 2 4   3 3 2 1 3
3 5

     SEQ.         FREQ.      CFM                          PROB.     REL  CONS.   CONTRIB.

     TB           1.57E-06                                                      1.52E-03
                             FCACCCGGDDBCBABBDCBABB      0.3299    8  2.94E+03  1.52E-03

     TBUX         3.72E-05                                                      3.17E-02
                             EBACCCFGFDBCBABBFCBABB      0.1435    5  4.30E+02  2.29E-03
                             EBACCCFGFDBCBACBFCBABB      0.0285    5  4.30E+02  4.55E-04
                             EBACCCFGFDBCBADBFCBABB      0.2563    5  4.30E+02  4.10E-03
                             EBACCCFGFDBCBADBFEBBBB      0.0347    5  4.30E+02  5.55E-04
                             EBACCCGGDDBCBABBFABABB      0.1225    8  2.94E+03  1.34E-02
                             EBACCCGGDDBCBABBFCBABB      0.0138    8  2.94E+03  1.51E-03
                             EBACCCGGEDBCBABBFCBABB      0.1435    7  1.52E+03  8.11E-03
                             EBACCCGGEDBCBABBFEBBBB      0.0194    6  1.00E+03  7.23E-04
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TB              0.05
     TBUX            0.95
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     EBACCCFGFDBCBABBFCBABB      0.07
     EBACCCFGFDBCBACBFCBABB      0.01
     EBACCCFGFDBCBADBFCBABB      0.12
     EBACCCFGFDBCBADBFEBBBB      0.02
     EBACCCGGDDBCBABBFABABB      0.40
     EBACCCGGDDBCBABBFCBABB      0.05
     EBACCCGGEDBCBABBFCBABB      0.24
     EBACCCGGEDBCBABBFEBBBB      0.02
     FCACCCGGDDBCBABBDCBABB      0.05
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  3D         0.02
     PCH  5D         0.22
     PCH  6D         0.02
     PCH  7D         0.24
     PCH  8D         0.49
1    CONSEQUENCE MEASURE:  LATENT CANCERS

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.  15     145-TH FROM BOTTOM     SAMPLE MEMBER  28  RISK= 4.658E-02
     ISSUE LEVELS:   3 4 2 2 3   2 2 3 2 1   3 3 2 2 1   2 5 3 2 1   2 2 3 2 2   2 4 3 2 3   3 4 2 1 3
5 2

     SEQ.         FREQ.      CFM                          PROB.     REL  CONS.   CONTRIB.

     TB           1.57E-06                                                      1.84E-03
                             FCACCCGGDDBCBABBEBBABB      0.3985    8  2.94E+03  1.84E-03

     TBUX         3.72E-05                                                      4.47E-02
```

```
                               EPACCCGGDDBCPABBFABABB    0.1192    7  1.52E+03  6.74E-03
                               EBACCCGGDDBCBABBFBBABB    0.5884    7  1.52E+03  3.33E-02
                               EBACCCGGDDBCBABBFCBBBB    0.0390    7  1.52E+03  2.20E-03
                               EBACCCGGEDBCBABBFCBBBB    0.0282    7  1.52E+03  1.59E-03
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TB             0.04
     TBUX           0.96
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     EBACCCGGDDBCBABBFABABB      0.14
     EBACCCGGDDBCBABBFBBABB      0.71
     EBACCCGGDDBCBABBFCBBBB      0.05
     EBACCCGGEDBCBABBFCBBBB      0.03
     FCACCCGGDDBCBABBEBBABB      0.04
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  5D        0.02
     PCH  7D        0.94
     PCH  8D        0.04
1    CONSEQUENCE MEASURE:  LATENT CANCERS

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.  16     146-TH FROM BOTTOM     SAMPLE MEMBER  34  RISK= 4.665F-02
     ISSUE LEVELS:   4 4 3 2 1    2 4 3 2 1    5 1 2 1 1    2 1 2 1 2    1 2 1 2 3    2 2 4 4 2    3 2 2 3 1
5 7

     SEQ.          FREQ.      CFM                              PROB.      REL  CONS.  CONTRIB.

     TBUX       3.10E-05                                                              4.63E-02
                               EBACBBGGDCBCBABBFBBABA    0.0686    6  1.00E+03  2.13E-03
                               EBACBCGGDCBCBABBFBBABA    0.0685    6  1.00E+03  2.12E-03
                               EBACBCGGDCBCBABBFFBBBA    0.0163    6  1.00E+03  5.05E-04
                               EBACCCGGDDBCBABBFABABB    0.0686    8  2.94E+03  6.24E-03
                               EBACCCGGDDBCBABBFBBABB    0.3386    8  2.94E+03  3.08E-02
                               EBACCCGGDDBCBABBFFBBBB    0.0448    8  2.94E+03  4.08E-03
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
     TBUX           0.99
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
     EBACBBGGDCBCBAPBFBPABA      0.05
     EBACBCGGDCBCBABBFBBABA      0.05
     EBACBCGGDCBCBABBFFBBBA      0.01
     EBACCCGGDDBCBABBFABABB      0.13
     EBACCCGGDDBCBABBFBBABB      0.66
     EBACCCGGDDBCBABBFFBBBB      0.09
0    LATENT CANCERS

     FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
     PCH  6D        0.10
     PCH  8D        0.88
1    CONSEQUENCE MEASURE:  LATENT CANCERS

     DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


     SELECTION NO.  17     147-TH FROM BOTTOM     SAMPLE MEMBER 120  RISK= 5.280E-02
     ISSUE LEVELS:   3 4 3 1 4    3 3 1 3 2    6 2 2 1 1    2 4 1 2 2    1 1 2 2 2    3 4 3 2 4    4 4 2 1 3
2 1

     SEQ.          FREQ.      CFM                              PROB.      REL  CONS.  CONTRIB.

     TB         3.32E-06                                                              3.62E-03
                               FCACCCGGDDBCBADBECBABB    0.3708    8  2.94E+03  3.62E-03

     TBUX       3.72E-05                                                              4.92E-02
                               EBACCCFGFDBBBADBFCBABB    0.0227    6  1.00E+03  8.46E-04
                               EBACCCFGFDBCBACBFCBABB    0.0239    6  1.00E+03  8.90E-04
                               EBACCCFGFDBCBADBFCBABB    0.3453    6  1.00E+03  1.28E-02
                               EBACCCFGFDBCBADBFEBBBB    0.0468    5  4.30E+02  7.48E-04
                               EBACCCGEFDBCCADBFCBABB    0.1820    6  1.00E+03  6.77E-03
                               EBACCCGEFDBCCADBFEBBBB    0.0247    6  1.00E+03  9.17E-04
                               EBACCCGGDDBBBADBFABABB    0.0093    8  2.94E+03  1.02E-03
                               EBACCCGGDDBCBADBFABABB    0.1411    8  2.94E+03  1.54E-02
                               EBACCCGGDDBCBADBFCBABB    0.0159    8  2.94E+03  1.74E-03
                               EBACCCGGEDBCBADBFCBABB    0.1298    7  1.52E+03  7.34E-03
                               EBACCCGGEDBCBADBFEBBBB    0.0176    6  1.00E+03  6.54E-04
0    LATENT CANCERS
```

```
        FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
        TB              0.07
        TBUX            0.93
0       LATENT CANCERS

        FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
        EBACCCFGFDBBBADBFCBABB      0.02
        EBACCCFGFDBCBACBFCBABB      C.02
        EBACCCFGFDBCBADBFCBABB      0.24
        EBACCCFGFDBCBADBFEBBBB      0.01
        EBACCCGEFDBCCADBFCBABB      0.13
        EBACCCGEFDBCCADBFEBBBB      0.02
        EBACCCGGDDBBBADBFABABB      0.02
        EBACCCGGDDBCBADBFABABB      0.29
        EBACCCGGDDBCBADBFCBABB      0.03
        EBACCCGGEDBCBADBFCBABB      0.14
        EBACCCGGEDBCBADBFEBBBB      0.01
        FCACCCGGDDBCBADBECBABB      0.07
0       LATENT CANCERS

        FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
        PCH  5D         0.01
        PCH  6D         0.43
        PCH  7D         0.14
        PCH  8D         0.41
1       CONSEQUENCE MEASURE:  LATENT CANCERS

        DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


        SELECTION NO.  18     148-TH FROM BOTTOM     SAMPLE MEMBER  20  RISK= 5.733E-02
        ISSUE LEVELS:    2 4 2 1 2    3 4 4 3 1    5 3 2 1 1    3 1 2 1 1    1 1 1 2 3    4 4 2 4 3    3 3 1 1 2
1 8

        SEQ.          FREQ.      CFM                          PROB.      REL  CONS.   CONTRIB.

        TBUX        3.50E-05                                                          5.69E-02
                                 EBACBBGGDCBCBABBFBBABA       0.0526     7  1.52E+03  2.80E-03
                                 EBACBCGGDCBCBADBFBBABA       0.0525     7  1.52E+03  2.79E-03
                                 EBACCCGGDDBCBADBFABABB       0.0936     9  2.32E+03  7.61E-03
                                 EBACCCGGDDBCBADBFBBABB       0.4624     9  2.32E+03  3.76E-02
                                 EBACCCGGDDBCBADBFFBBBB       0.0612     9  2.32E+03  4.98E-03
0       LATENT CANCERS

        FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
        TBUX            0.99
0       LATENT CANCERS

        FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
        EBACBBGGDCBCBABBFBBABA      0.05
        EBACBCGGDCBCBADBFBBABA      0.05
        EBACCCGGDDBCBADBFABABB      0.13
        EBACCCGGDDBCBADBFBBABB      0.66
        EBACCCGGDDBCBADBFFBBBB      0.09
0       LATENT CANCERS

        FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
        PCH  5D         0.02
        PCH  7D         0.10
        PCH  9D         0.88
1       CONSEQUENCE MEASURE:  LATENT CANCERS

        DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


        SELECTION NO.  19     149-TH FROM BOTTOM     SAMPLE MEMBER  74  RISK= 6.663E-02
        ISSUE LEVELS:    4 4 3 2 2    3 2 2 2 1    6 3 2 1 1    2 3 2 1 2    1 2 3 2 4    2 2 3 3 3    3 3 2 1 3
2 8

        SEQ.          FREQ.      CFM                          PROB.      REL  CONS.   CONTRIB.

        TBUX        3.50E-05                                                          6.55E-02
                                 EBACBBGGDCBCBABBFBBABA       0.0527     5  4.30E+02  7.93E-04
                                 EBACBCGGDCBCBABBFBBABA       0.0525     5  4.30E+02  7.91E-04
                                 EBACCCGGDDBCBABBFABABB       0.0937     8  2.94E+03  9.65E-03
                                 EBACCCGGDDBCBABBFBBABB       0.4629     8  2.94E+03  4.77E-02
                                 EBACCCGGDDBCBABBFEBBBB       0.0613     8  2.94E+03  6.31E-03
0       LATENT CANCERS

        FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
        TBUX            0.98
0       LATENT CANCERS

        FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
        EBACBBGGDCBCBABBFBBABA      0.01
        EBACBCGGDCBCBABBFBBABA       0.01
        EBACCCGGDDBCBABBFABABB       0.14
        EBACCCGGDDBCBABBFBBABB       0.72
        EBACCCGGDDBCBABBFEBBBB       0.09
0       LATENT CANCERS

        FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
        PCH  5D          0.02
        PCH  8D          0.96
1       CONSEQUENCE MEASURE:  LATENT CANCERS

        DETAILED ANALYSIS OF INDIVIDUAL SAMPLE MEMBERS


        SELECTION NO.  20     150-TH FROM BOTTOM     SAMPLE MEMBER 149  RISK= 8.960E-02
        ISSUE LEVELS:   2 4 3 1 3   4 1 2 3 1   6 2 2 2 1   3 2 3 1 2   1 2 1 2 2   2 3 3 3 2   3 4 1 3 2
1 7

        SEQ.         FREQ.      CFM                          PROB.     REL  CONS.  CONTRIB.

        TB          1.57E-06                                                       1.88E-03
                                FCACCCGGDDBCBABBDBBABB      0.4064     8  2.94E+03 1.88E-03

        TBUX        3.72E-05                                                       8.77E-02
                                EBACBCGGDCBCBABBFBBABA      0.0264     6  1.00E+03 9.81E-04
                                EBACCCGGDDBCBABBFABABB      0.1196     8  2.94E+03 1.31E-02
                                EBACCCGGDDBCBABBFBBABB      0.5907     8  2.94E+03 6.46E-02
                                EBACCCGGDDBCBABBFEBBBB      0.0782     8  2.94E+03 8.55E-03
0       LATENT CANCERS

        FRACTIONAL CONTRIBUTIONS OF EACH SEQUENCE
        TB               0.02
        TBUX             0.98
0       LATENT CANCERS

        FRACTIONAL CONTRIBUTIONS OF EACH CF BIN
        EBACBCGGDCBCBABBFBBABA       0.01
        EBACCCGGDDBCBABBFABABB       0.15
        EBACCCGGDDBCBABBFBBABB       0.72
        EBACCCGGDDBCBABBFEBBBB       0.10
        FCACCCGGDDBCBABBDBBABB       0.02
0       LATENT CANCERS

        FRACTIONAL CONTRIBUTIONS OF EACH RELEASE
        PCH  6D          0.01
        PCH  8D          0.98
```

C.3 LISTING OF RISQUE OUTPUT: CENTRAL ESTIMATE WITH MACCS CONSEQUENCES

```
1    BASE CASE:  PEACH BOTTOM LLH (M
     Specific information concerning input data follows :
     HEADER : CONS. BY MACCS, SEQ BY TEMAC, ST BY RELTRAC

     SEQUENCES : P.B. SEQ. FREQS. FOR LALH: 1=TB,2=TBUX,3=TBU,4=TCSX,5=TCUX,6=TCSRX2,7=TCSRV23
     CONTAINMENT FAILURE MODES : PEACH BOTTOM CENTRAL - BASE & S.O. MASTER KEEPBIN FILE - 6 DEC 86
     RELEASES :  PEACH BOTTOM RELTRAC CENTRAL CLUSTER ASSIGNMENTS

     CONSEQUENCES : CONSEQUENCES BY MACCS 12/09/86

1    MEAN CFM PROBABILITIES FOR EACH CFG

     ICFG =  1
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0365 0.0000 0.0000
 0.0000 0.0000 0.0291 0.2908 0.0000      0.0820 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0383 0.0000 0.0000 0.0905      0.0281 0.1196

     ICFG =  2
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0285 0.0000 0.0000 0.0222 0.0000
 0.0000 0.0381 0.0494 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0393 0.3457      0.0000 0.0000 0.0975 0.0000 0.0381
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0662 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000

     ICFG =  3
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.3309 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000

     ICFG =  4
 0.0000 0.0000 0.1737 0.0000 0.8147      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000

     ICFG =  5
 0.3810 0.6236 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000

     ICFG =  6
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.3511 0.0000
 0.0000 0.2464 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000

     ICFG =  7
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.3634 0.2693      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000 0.0000 0.0000 0.0000
 0.0000 0.0000 0.0000 0.0000 0.0000      0.0000 0.0000
 RESULTS ARE ABSOLUTE RISK PER YEAR

 BASE CASE OUTPUT WILL BE PRINTED

 MEAN =    6.631E-06     VARIANCE =    0.000E+00


CONSEQUENCE MEASURE:
 EARLY FATALITIES

 BASE CASE :
  PEACH BOTTOM LLH (MACCS)

 MEAN =    2.326E-05     VARIANCE =    0.000E+00


CONSEQUENCE MEASURE:
  EARLY FATALITIES

  BASE CASE :
   PEACH BOTTOM LLH (MACCS)

  FRACTIONAL CONTRIBUTION OF EACH SEQUENCE TO MEAN RISK
               SEQUENCE            CONTRIBUTION
               TB                        0.2603
               TBUX                      0.7173
               TBU                       0.0214
               TCSX                      0.0003
               TCUX                      0.0000
               TCSRX2                    0.0006
               TCSRV23                   0.0001

CONSEQUENCE MEASURE:
  EARLY FATALITIES

  BASE CASE :
   PEACH BOTTOM LLH (MACCS)

  FRACTIONAL CONTRIBUTION OF EACH NONZERO BIN TO MEAN RISK
               BIN                                        CONTRIBUTION
               BAACACGBDAACBBBBHHABBB                       0.0003
               DAAAACGBDDACBBBBHHABBB                       0.0006
               DABAACGADDACBBBBHGABAB                       0.0001
               EBAACCGGDDBCBABBEHABBB                       0.0214
               EBACBBGCDCBCBABBFDABBA                       0.0010
               EBACBCGGDCBCBABBFDABBA                       0.0015
               EBACCCGGDDBCBABBFCBABB                       0.0438
               EBACCCGGDDBCBABBFDABBB                       0.3665
               EBACCCGGDC BCBADBFDABBB                      0.3046
               FCACCCDGFDBCBADBEDABBB                       0.0029
               FCACCCGGDDBCBABBECBABB                       0.0099
               FCACCCGGDDBCBABBEDABBB                       0.1067
               FCACCCGGDDBCBADBEDABBB                       0.1408
```

362

```
CONSEQUENCE MEASURE:
  EARLY FATALITIES

  BASE CASE :
   PEACH BOTTOM LLH (MACCS)

  FRACTIONAL CONTRIBUTIONS OF EACH RELEASE TO MEAN RISK
                      RELEASE              CONTRIBUTION
                      PCH  1I                    0.0000
                      PCH  2I                    0.0000
                      PCH  3I                    0.0003
                      PCH  4I                    0.0000
                      PCH  5I                    0.0000
                      PCH  6I                    0.0000
                      PCH  7I                    0.0000
                      PCH  8I                    0.0000
                      PCH  9I                    0.0000
                      PCH 10I                    0.0000
                      PCH 11I                    0.0000
                      PCH 12I                    0.0006
                      PCH 13I                    0.0000
                      PCH 14I                    0.0000
                      PCH 15I                    0.0001
                      PCH 16I                    0.0000
                      PCH 17I                    0.0000
                      PCH 18I                    0.0000
                      PCH 19I                    0.0000
                      PCH 20I                    0.0000
                      PCH 21I                    0.0000
                      PCH 22I                    0.0214
                      PCH 23I                    0.0000
                      PCH 24I                    0.0000
                      PCH 25I                    0.0000
                      PCH 26I                    0.0010
                      PCH 27I                    0.0000
                      PCH 28I                    0.0000
                      PCH 29I                    0.0015
                      PCH 30I                    0.0000
                      PCH 31I                    0.0000
                      PCH 32I                    0.0000
                      PCH 33I                    0.0000
                      PCH 34I                    0.0000
                      PCH 35I                    0.0000
                      PCH 36I                    0.0000
                      PCH 37I                    0.0000
                      PCH 38I                    0.0000
                      PCH 39I                    0.0000
                      PCH 40I                    0.0000
                      PCH 41I                    0.0000
                      PCH 42I                    0.0000
                      PCH 43I                    0.0000
                      PCH 44I                    0.0438
                      PCH 45I                    0.3665
                      PCH 46I                    0.0000
                      PCH 47I                    0.0000
                      PCH 48I                    0.3046
                      PCH 49I                    0.0000
                      PCH 50I                    0.0000
                      PCH 51I                    0.0000
                      PCH 52I                    0.0000
                      PCH 53I                    0.0000
                      PCH 54I                    0.0000
                      PCH 55I                    0.0000
                      PCH 56I                    0.0000
                      PCH 57I                    0.0000
                      PCH 58I                    0.0029
                      PCH 59I                    0.0000
                      PCH 60I                    0.0000
                      PCH 61I                    0.0000
                      PCH 62I                    0.0000
                      PCH 63I                    0.0099
                      PCH 64I                    0.1067
                      PCH 65I                    0.0000
                      PCH 66I                    0.1408
                      PCH 67I                    0.0000
                      PCH 68I                    0.0000
                      PCH 69I                    0.0000
                      PCH 70I                    0.0000
                      PCH 71I                    0.0000
                      PCH 72I                    0.0000
                      PCH 73I                    0.0000
                      PCH 74I                    0.0000
                      PCH 75I                    0.0000
                      PCH 76I                    0.0000
                      PCH 77I                    0.0000
```

363

```
1    CONSEQUENCE MEASURE:
     EARLY ILLNESS


     BASE CASE :
      PEACH BOTTOM LLH (MACCS)


     MEAN =    1.315E-04     VARIANCE =     0.000E+00



   CONSEQUENCE MEASURE:
     EARLY ILLNESS


     BASE CASE :
      PEACH BOTTOM LLH (MACCS)

     FRACTIONAL CONTRIBUTION OF EACH SEQUENCE TO MEAN RISK
                     SEQUENCE             CONTRIBUTION
                     TB                         0.4202
                     TBUX                       0.5692
                     TBU                        0.0097
                     TCSX                       0.0003
                     TCUX                       0.0001
                     TCSRX2                     0.0005
                     TCSRV23                    0.0001



    CONSEQUENCE MEASURE:
     EARLY ILLNESS


     BASE CASE :
      PEACH BOTTOM LLH (MACCS)

     FRACTIONAL CONTRIBUTION OF EACH NONZERO BIN TO MEAN RISK
                     BIN                                      CONTRIBUTION
                     AAACACGGDABCBABBECABBB                         0.0001
                     BAACACGBDAACBBBBHHABBB                         0.0003
                     DAAAACGBDDACBBBBHHABBB                         0.0005
                     DABAACGADDACBBBBHGABAB                         0.0001
                     EBAACCGGDDBCBABBEHABBB                         0.0097
                     EBACBBGGDCBCBABBFDABBA                         0.0007
                     EBACBCGGDCBCBABBFDABBA                         0.0009
                     EBACCCGGDDBCBABBFCBABB                         0.0210
                     EBACCCGGDDBCBABBFDABBB                         0.1667
                     EBACCCGGDDBCBADBFDABBB                         0.3799
                     FCACCCDGFDBCBADBEDABBB                         0.0077
                     FCACCCGGDDBCBABBECBABB                         0.0167
                     FCACCCGGDDBCBABBEDABBB                         0.1750
                     FCACCCGGDDBCBADBEDABBB                         0.2208
```

```
CONSEQUENCE MEASURE:
 EARLY ILLNESS

 BASE CASE :
  PEACH BOTTOM LLH (MACCS)

 FRACTIONAL CONTRIBUTIONS OF EACH RELEASE TO MEAN RISK
                 RELEASE                CONTRIBUTION
                 PCH  1I                   0.0001
                 PCH  2I                   0.0000
                 PCH  3I                   0.0003
                 PCH  4I                   0.0000
                 PCH  5I                   0.0000
                 PCH  6I                   0.0000
                 PCH  7I                   0.0000
                 PCH  8I                   0.0000
                 PCH  9I                   0.0000
                 PCH 10I                   0.0000
                 PCH 11I                   0.0000
                 PCH 12I                   0.0005
                 PCH 13I                   0.0000
                 PCH 14I                   0.0000
                 PCH 15I                   0.0001
                 PCH 16I                   0.0000
                 PCH 17I                   0.0000
                 PCH 18I                   0.0000
                 PCH 19I                   0.0000
                 PCH 20I                   0.0000
                 PCH 21I                   0.0000
                 PCH 22I                   0.0097
                 PCH 23I                   0.0000
                 PCH 24I                   0.0000
                 PCH 25I                   0.0000
                 PCH 26I                   0.0007
                 PCH 27I                   0.0000
                 PCH 28I                   0.0000
                 PCH 29I                   0.0009
                 PCH 30I                   0.0000
                 PCH 31I                   0.0000
                 PCH 32I                   0.0000
                 PCH 33I                   0.0000
                 PCH 34I                   0.0000
                 PCH 35I                   0.0000
                 PCH 36I                   0.0000
                 PCH 37I                   0.0000
                 PCH 38I                   0.0000
                 PCH 39I                   0.0000
                 PCH 40I                   0.0000
                 PCH 41I                   0.0000
                 PCH 42I                   0.0000
                 PCH 43I                   0.0000
                 PCH 44I                   0.0210
                 PCH 45I                   0.1667
                 PCH 46I                   0.0000
                 PCH 47I                   0.0000
                 PCH 48I                   0.3799
                 PCH 49I                   0.0000
                 PCH 50I                   0.0000
                 PCH 51I                   0.0000
                 PCH 52I                   0.0000
                 PCH 53I                   0.0000
                 PCH 54I                   0.0000
                 PCH 55I                   0.0000
                 PCH 56I                   0.0000
                 PCH 57I                   0.0000
                 PCH 58I                   0.0077
                 PCH 59I                   0.0000
                 PCH 60I                   0.0000
                 PCH 61I                   0.0000
                 PCH 62I                   0.0000
                 PCH 63I                   0.0167
                 PCH 64I                   0.1750
                 PCH 65I                   0.0000
                 PCH 66I                   0.2208
                 PCH 67I                   0.0000
                 PCH 68I                   0.0000
                 PCH 69I                   0.0000
                 PCH 70I                   0.0000
                 PCH 71I                   0.0000
                 PCH 72I                   0.0000
                 PCH 73I                   0.0000
                 PCH 74I                   0.0000
                 PCH 75I                   0.0000
                 PCH 76I                   0.0000
                 PCH 77I                   0.0000
```

```
1     CONSEQUENCE MEASURE:
      IND.RISK OF FATALITY


      BASE CASE :
       PEACH BOTTOM LLH (MACCS)


      MEAN =    1.168E-08     VARIANCE =    0.000E+00


1     CONSEQUENCE MEASURE:
      IND.RISK OF FATALITY


      BASE CASE :
       PEACH BOTTOM LLH (MACCS)

      FRACTIONAL CONTRIBUTION OF EACH SEQUENCE TO MEAN RISK
                      SEQUENCE            CONTRIBUTION
                      TB                        0.1046
                      TBUX                      0.8506
                      TBU                       0.0355
                      TCSX                      0.0027
                      TCUX                      0.0005
                      TCSRX2                    0.0054
                      TCSRV23                   0.0007


    CONSEQUENCE MEASURE:
      IND.RISK OF FATALITY


      BASE CASE :
       PEACH BOTTOM LLH (MACCS)

      FRACTIONAL CONTRIBUTION OF EACH NONZERO BIN TO MEAN RISK
                      BIN                                 CONTRIBUTION
                      AAACACGGDABCBABBECABBB                    0.0005
                      BAACACGBDAACBBBBHHABBB                    0.0027
                      DAAAACGBDDACBBBBHHABBB                    0.0054
                      DABAACGADABCBBBBHGABAB                    0.0001
                      DABAACGADDACBBBBHGABAB                    0.0007
                      EBAACCGGDDBCBABBEHABBB                    0.0355
                      EBACBBGGDCBCBABBFDABBA                    0.0144
                      EBACBCGGDCBCBABBFDABBA                    0.0161
                      EBACCCGGDDBCBABBFCBABB                    0.0658
                      EBACCCGGDDBCBABBFDABBB                    0.6089
                      EBACCCGGDDBCBADBFDABBB                    0.1454
                      FCACCCDGFDBCBADBEDABBB                    0.0083
                      FCACCCGGDDBCBABBECBABB                    0.0072
                      FCACCCGGDDBCBABBEDABBB                    0.0737
                      FCACCCGGDDBCBADBEDABBB                    0.0153
```

```
CONSEQUENCE MEASURE:
  IND.RISK OF FATALITY


  BASE CASE :
   PEACH BOTTOM LLH (MACCS)

  FRACTIONAL CONTRIBUTIONS OF EACH RELEASE TO MEAN RISK
                   RELEASE                  CONTRIBUTION
                   PCH  1I                        0.0005
                   PCH  2I                        0.0000
                   PCH  3I                        0.0027
                   PCH  4I                        0.0000
                   PCH  5I                        0.0000
                   PCH  6I                        0.0000
                   PCH  7I                        0.0000
                   PCH  8I                        0.0000
                   PCH  9I                        0.0000
                   PCH 10I                        0.0000
                   PCH 11I                        0.0000
                   PCH 12I                        0.0054
                   PCH 13I                        0.0000
                   PCH 14I                        0.0001
                   PCH 15I                        0.0007
                   PCH 16I                        0.0000
                   PCH 17I                        0.0000
                   PCH 18I                        0.0000
                   PCH 19I                        0.0000
                   PCH 20I                        0.0000
                   PCH 21I                        0.0000
                   PCH 22I                        0.0355
                   PCH 23I                        0.0000
                   PCH 24I                        0.0000
                   PCH 25I                        0.0000
                   PCH 26I                        0.0144
                   PCH 27I                        0.0000
                   PCH 28I                        0.0000
                   PCH 29I                        0.0161
                   PCH 30I                        0.0000
                   PCH 31I                        0.0000
                   PCH 32I                        0.0000
                   PCH 33I                        0.0000
                   PCH 34I                        0.0000
                   PCH 35I                        0.0000
                   PCH 36I                        0.0000
                   PCH 37I                        0.0000
                   PCH 38I                        0.0000
                   PCH 39I                        0.0000
                   PCH 40I                        0.0000
                   PCH 41I                        0.0000
                   PCH 42I                        0.0000
                   PCH 43I                        0.0000
                   PCH 44I                        0.0658
                   PCH 45I                        0.6089
                   PCH 46I                        0.0000
                   PCH 47I                        0.0000
                   PCH 48I                        0.1454
                   PCH 49I                        0.0000
                   PCH 50I                        0.0000
                   PCH 51I                        0.0000
                   PCH 52I                        0.0000
                   PCH 53I                        0.0000
                   PCH 54I                        0.0000
                   PCH 55I                        0.0000
                   PCH 56I                        0.0000
                   PCH 57I                        0.0000
                   PCH 58I                        0.0083
                   PCH 59I                        0.0000
                   PCH 60I                        0.0000
                   PCH 61I                        0.0000
                   PCH 62I                        0.0000
                   PCH 63I                        0.0072
                   PCH 64I                        0.0737
                   PCH 65I                        0.0000
                   PCH 66I                        0.0153
                   PCH 67I                        0.0000
                   PCH 68I                        0.0000
                   PCH 69I                        0.0000
                   PCH 70I                        0.0000
                   PCH 71I                        0.0000
                   PCH 72I                        0.0000
                   PCH 73I                        0.0000
                   PCH 74I                        0.0000
                   PCH 75I                        0.0000
                   PCH 76I                        0.0000
                   PCH 77I                        0.0000
```

```
1    CONSEQUENCE MEASURE:
     LATENT CANCERS


     BASE CASE :
      PEACH BOTTOM LLH (MACCS)


     MEAN =    1.958E-02     VARIANCE =    0.000E+00



   CONSEQUENCE MEASURE:
     LATENT CANCERS


     BASE CASE :
      PEACH BOTTOM LLH (MACCS)

     FRACTIONAL CONTRIBUTION OF EACH SEQUENCE TO MEAN RISK
                   SEQUENCE              CONTRIBUTION
                   TB                          0.2360
                   TBUX                        0.7204
                   TBU                         0.0260
                   TCSX                        0.0041
                   TCUX                        0.0029
                   TCSRX2                      0.0093
                   TCSRV23                     0.0012



    CONSEQUENCE MEASURE:
     LATENT CANCERS


     BASE CASE :
      PEACH BOTTOM LLH (MACCS)

     FRACTIONAL CONTRIBUTION OF EACH NONZERO BIN TO MEAN RISK
                   BIN                                        CONTRIBUTION
                   AAACACGGDABCBABBECABBB                          0.0029
                   BAACACGBDAACBBBBHHABBB                          0.0041
                   DAAAAAGBDABCBBBBHHABBB                          0.0008
                   DAAAACGBDDACBBBBHHABBB                          0.0085
                   DABAAAGADABCBBBBHGABAB                          0.0002
                   DABAACGADDACBBBBHGABAB                          0.0010
                   EBAACCGGDDBCBABBEHABBB                          0.0260
                   EBACBBGGDCBCBABBFDABBA                          0.0102
                   EBACBCGGDCBCBABBFDABBA                          0.0092
                   EBACCCFGFDBCBABBFDABBB                          0.0002
                   EBACCCFGFDBCBADBFDABBB                          0.0004
                   EBACCCGGDDBCBABBFCBABB                          0.0509
                   EBACCCGGDDBCBABBFDABBB                          0.4465
                   EBACCCGGDDBCBADBFDABBB                          0.2023
                   EBACCCGGEDBCBABBFDABBB                          0.0007
                   FCACCCDGFDBCBADBEDABBB                          0.0151
                   FCACCCGGDDBCBABBECBABB                          0.0142
                   FCACCCGGDDBCBABBEDABBB                          0.1432
                   FCACCCGGDDBCBADBEDABBB                          0.0633
                   FCCBAAGCFBBCCBBBHHABBB                          0.0002
```

CONSEQUENCE MEASURE:
LATENT CANCERS

BASE CASE :
PEACH BOTTOM LLH (MACCS)

FRACTIONAL CONTRIBUTIONS OF EACH RELEASE TO MEAN RISK

RELEASE	CONTRIBUTION
PCH 1I	0.0029
PCH 2I	0.0000
PCH 3I	0.0041
PCH 4I	0.0000
PCH 5I	0.0000
PCH 6I	0.0000
PCH 7I	0.0000
PCH 8I	0.0000
PCH 9I	0.0008
PCH 10I	0.0000
PCH 11I	0.0000
PCH 12I	0.0085
PCH 13I	0.0000
PCH 14I	0.0002
PCH 15I	0.0010
PCH 16I	0.00[illegible]
PCH 17I	0.00[illegible]
PCH 18I	0.0[illegible]
PCH 19I	0.0[illegible]
PCH 20I	0.00[illegible]
PCH 21I	0.000[illegible]
PCH 22I	0.0260
PCH 23I	0.0000
PCH 24I	0.0000
PCH 25I	0.0000
PCH 26I	0.0102
PCH 27I	0.0000
PCH 28I	0.0000
PCH 29I	0.0092
PCH 30I	0.0000
PCH 31I	0.0000
PCH 32I	0.0002
PCH 33I	0.0004
PCH 34I	0.0000
PCH 35I	0.0000
PCH 36I	0.0000
PCH 37I	0.0000
PCH 38I	0.0000
PCH 39I	0.0000
PCH 40I	0.0000
PCH 41I	0.0000
PCH 42I	0.0000
PCH 43I	0.0000
PCH 44I	0.0509
PCH 45I	0.4465
PCH 46I	0.0000
PCH 47I	0.0000
PCH 48I	0.2023
PCH 49I	0.0000
PCH 50I	0.0007
PCH 51I	0.0000
PCH 52I	0.0000
PCH 53I	0.0000
PCH 54I	0.0000
PCH 55I	0.0000
PCH 56I	0.0000
PCH 57I	0.0000
PCH 58I	0.0151
PCH 59I	0.0000
PCH 60I	0.0000
PCH 61I	0.0000
PCH 62I	0.0000
PCH 63I	0.0142
PCH 64I	0.1432
PCH 65I	0.0000
PCH 66I	0.0633
PCH 67I	0.0000
PCH 68I	0.0000
PCH 69I	0.0000
PCH 70I	0.0000
PCH 71I	0.0000
PCH 72I	0.0000
PCH 73I	0.0000
PCH 74I	0.0000
PCH 75I	0.0002
PCH 76I	0.0000
PCH 77I	0.0000

369

```
1    CONSEQUENCE MEASURE:
     POP. DOSE 50 MI.


     BASE CASE :
      PEACH BOTTOM LLH (MACCS)


     MEAN =    6.140E+01     VARIANCE =    0.000E+00

   CONSEQUENCE MEASURE:
     POP. DOSE 50 MI.


     BASE CASE :
      PEACH BOTTOM LLH (MACCS)

     FRACTIONAL CONTRIBUTION OF EACH SEQUENCE TO MEAN RISK
                   SEQUENCE            CONTRIBUTION
                   TB                        0.2138
                   TBUX                      0.7302
                   TBU                       0.0269
                   TCSX                      0.0059
                   TCUX                      0.0091
                   TCSRX2                    0.0125
                   TCSRV23                   0.0015


   CONSEQUENCE MEASURE:
     POP. DOSE 50 MI.


     BASE CASE :
      PEACH BOTTOM LLH (MACCS)

     FRACTIONAL CONTRIBUTION OF EACH NONZERO BIN TO MEAN RISK
                   BIN                                 CONTRIBUTION
                   AAACACGGDABCBABBECABBB                 0.0091
                   BAACACGBDAACBBBBHHABBB                 0.0059
                   DAAAAAGBDABCBBBBHHABBB                 0.0006
                   DAAAACGBDDACBBBBHHABBB                 0.0119
                   DABAAAGADABCBBBBHGABAB                 0.0001
                   DABAACGADDACBBBBHGABAB                 0.0014
                   EBAACCGGDDBCBABBEHABBB                 0.0269
                   EBACBBGGDCBCBABBFDABBA                 0.0163
                   EBACBCGGDCBCBABBFDABBA                 0.0136
                   EBACCCFGFDBCBABBFDABBB                 0.0003
                   EBACCCFGFDBCBADBFDABBB                 0.0007
                   EBACCCGGDDBCBABBFCBABB                 0.0525
                   EBACCCGGDDBCBABBFDABBB                 0.4611
                   EBACCCGGDDBCBADBFDABBB                 0.1847
                   EBACCCGGEDBCBABBFDABBB                 0.0009
                   FCACCCDGFDBCBADBEDABBB                 0.0145
                   FCACCCGGDDBCBABBECBABB                 0.0133
                   FCACCCGGDDBCBABBEDABBB                 0.1337
                   FCACCCGGDDBCBADBEDABBB                 0.0522
                   FCBBACGEFBBCCABBEGABBB                 0.0001
                   FCCBAAGCFBBCCBBBHHABBB                 0.0001
```

370

```
CONSEQUENCE MEASURE:
  POP. DOSE 50 MI.

  BASE CASE :
   PEACH BOTTOM LLH (MACCS)

  FRACTIONAL CONTRIBUTIONS OF EACH RELEASE TO MEAN RISK
                  RELEASE              CONTRIBUTION
                  PCH  1I                   0.0091
                  PCH  2I                   0.0000
                  PCH  3I                   0.0059
                  PCH  4I                   0.0000
                  PCH  5I                   0.0000
                  PCH  6I                   0.0000
                  PCH  7I                   0.0000
                  PCH  8I                   0.0000
                  PCH  9I                   0.0006
                  PCH 10I                   0.0000
                  PCH 11I                   0.0000
                  PCH 12I                   0.0119
                  PCH 13I                   0.0000
                  PCH 14I                   0.0000
                  PCH 15I                   0.0014
                  PCH 16I                   0.0000
                  PCH 17I                   0.0000
                  PCH 18I                   0.0000
                  PCH 19I                   0.0000
                  PCH 20I                   0.0000
                  PCH 21I                   0.0000
                  PCH 22I                   0.0269
                  PCH 23I                   0.0000
                  PCH 24I                   0.0000
                  PCH 25I                   0.0000
                  PCH 26I                   0.0163
                  PCH 27I                   0.0000
                  PCH 28I                   0.0000
                  PCH 29I                   0.0136
                  PCH 30I                   0.0000
                  PCH 31I                   0.0000
                  PCH 32I                   0.0003
                  PCH 33I                   0.0007
                  PCH 34I                   0.0000
                  PCH 35I                   0.0000
                  PCH 36I                   0.0000
                  PCH 37I                   0.0000
                  PCH 38I                   0.0000
                  PCH 39I                   0.0000
                  PCH 40I                   0.0000
                  PCH 41I                   0.0000
                  PCH 42I                   0.0000
                  PCH 43I                   0.0000
                  PCH 44I                   0.0525
                  PCH 45I                   0.4611
                  PCH 46I                   0.0000
                  PCH 47I                   0.0000
                  PCH 48I                   0.1847
                  PCH 49I                   0.0000
                  PCH 50I                   0.0009
                  PCH 51I                   0.0000
                  PCH 52I                   0.0000
                  PCH 53I                   0.0000
                  PCH 54I                   0.0000
                  PCH 55I                   0.0000
                  PCH 56I                   0.0000
                  PCH 57I                   0.0000
                  PCH 58I                   0.0145
                  PCH 59I                   0.0000
                  PCH 60I                   0.0000
                  PCH 61I                   0.0000
                  PCH 62I                   0.0000
                  PCH 63I                   0.0133
                  PCH 64I                   0.1337
                  PCH 65I                   0.0000
                  PCH 66I                   0.0522
                  PCH 67I                   0.0000
                  PCH 68I                   0.0000
                  PCH 69I                   0.0000
                  PCH 70I                   0.0000
                  PCH 71I                   0.0000
                  PCH 72I                   0.0001
                  PCH 73I                   0.0000
                  PCH 74I                   0.0000
                  PCH 75I                   0.0001
                  PCH 76I                   0.0000
                  PCH 77I                   0.0000
```

```
1    CONSEQUENCE MEASURE:
     PROPERTY DAMAGE


     BASE CASE :
      PEACH BOTTOM LLH (MACCS)


     MEAN =    3.533E+04     VARIANCE =    0.000E+00


   CONSEQUENCE MEASURE:
     PROPERTY DAMAGE


     BASE CASE :
      PEACH BOTTOM LLH (MACCS)

     FRACTIONAL CONTRIBUTION OF EACH SEQUENCE TO MEAN RISK
                   SEQUENCE              CONTRIBUTION
                   TB                         0.2615
                   TBUX                       0.7050
                   TBU                        0.0252
                   TCSX                       0.0023
                   TCUX                       0.0006
                   TCSRX2                     0.0048
                   TCSRV23                    0.0005


   CONSEQUENCE MEASURE:
     PROPERTY DAMAGE


     BASE CASE :
      PEACH BOTTOM LLH (MACCS)

     FRACTIONAL CONTRIBUTION OF EACH NONZERO BIN TO MEAN RISK
                   BIN                                   CONTRIBUTION
                   AAACACGGDABCBABBECABBB                     0.0006
                   BAACACGBDAACBBBBHHABBB                     0.0023
                   DAAAAAGBDABCBBBBHHABBB                     0.0001
                   DAAAACGBDDACBBBBHHABBB                     0.0047
                   DABAACGADDACBBBBHGABAB                     0.0005
                   EBAACCGGDDBCBABBEHABBB                     0.0252
                   EBACBBGGDCBCBABBFDABBA                     0.0032
                   EBACBCGGDCBCBABBFDABBA                     0.0035
                   EBACCCGGDDBCBABBFCBABB                     0.0519
                   EBACCCGGDDBCBABBFDABBB                     0.4316
                   EBACCCGGDDBCBADBFDABBB                     0.2145
                   EBACCCGGEDBCBABBFDABBB                     0.0002
                   FCACCCDGFDBCBADBEDABBB                     0.0147
                   FCACCCGGDDBCBABBECBABB                     0.0160
                   FCACCCGGDDBCBABBEDABBB                     0.1597
                   FCACCCGGDDBCBADBEDABBB                     0.0711
```

CONSEQUENCE MEASURE:
PROPERTY DAMAGE

BASE CASE :
PEACH BOTTOM LLH (MACCS)

FRACTIONAL CONTRIBUTIONS OF EACH RELEASE TO MEAN RISK

RELEASE	CONTRIBUTION
PCH 1I	0.0006
PCH 2I	0.0000
PCH 3I	0.0023
PCH 4I	0.0000
PCH 5I	0.0000
PCH 6I	0.0000
PCH 7I	0.0000
PCH 8I	0.0000
PCH 9I	0.0001
PCH 10I	0.0000
PCH 11I	0.0000
PCH 12I	0.0047
PCH 13I	0.0000
PCH 14I	0.0000
PCH 15I	0.0005
PCH 16I	0.0000
PCH 17I	0.0000
PCH 18I	0.0000
PCH 19I	0.0000
PCH 20I	0.0000
PCH 21I	0.0000
PCH 22I	0.0252
PCH 23I	0.0000
PCH 24I	0.0000
PCH 25I	0.0000
PCH 26I	0.0032
PCH 27I	0.0000
PCH 28I	0.0000
PCH 29I	0.0035
PCH 30I	0.0000
PCH 31I	0.0000
PCH 32I	0.0000
PCH 33I	0.0000
PCH 34I	0.0000
PCH 35I	0.0000
PCH 36I	0.0000
PCH 37I	0.0000
PCH 38I	0.0000
PCH 39I	0.0000
PCH 40I	0.0000
PCH 41I	0.0000
PCH 42I	0.0000
PCH 43I	0.0000
PCH 44I	0.0519
PCH 45I	0.4316
PCH 46I	0.0000
PCH 47I	0.0000
PCH 48I	0.2145
PCH 49I	0.0000
PCH 50I	0.0002
PCH 51I	0.0000
PCH 52I	0.0000
PCH 53I	0.0000
PCH 54I	0.0000
PCH 55I	0.0000
PCH 56I	0.0000
PCH 57I	0.0000
PCH 58I	0.0147
PCH 59I	0.0000
PCH 60I	0.0000
PCH 61I	0.0000
PCH 62I	0.0000
PCH 63I	0.0160
PCH 64I	0.1597
PCH 65I	0.0000
PCH 66I	0.0711
PCH 67I	0.0000
PCH 68I	0.0000
PCH 69I	0.0000
PCH 70I	0.0000
PCH 71I	0.0000
PCH 72I	0.0000
PCH 73I	0.0000
PCH 74I	0.0000
PCH 75I	0.0000
PCH 76I	0.0000
PCH 77I	0.0000

```
COSTS OF MELTDOWN ACCIDENTS
ANNUAL OFFSITE COSTS AS THE SUM OF :
PROP. DAM., 1E6*EARLY FAT., 1.E5*ILLNESS, AND 1.E5*LATENT CANCERS
MEAN =    3.732E+04
PERCENTILES :
     5-TH =    3.732E+04     50-TH =    3.732E+04     95-TH =    3.732E+04

ANNUAL OFFSITE COST AS 1E3*POP. DOSE
MEAN =    4.093E+04
PERCENTILES :
     5-TH =    6.140E+04     50-TH =    6.140E+04     95-TH =    6.140E+04

ANNUAL ONSITE COSTS :
MEAN =    1.754E+04
PERCENTILES :
     5-TH =    1.168E+04     50-TH =    1.700E+04     95-TH =    2.393E+04


TOTAL COSTS BASED ON SUMMED OFFSITE COSTS
MEAN =    5.486E+04
PERCENTILES :
     5-TH =    4.900E+04     50-TH =    5.432E+04     95-TH =    6.125E+04

TOTAL COSTS BASED ON 1E3*POP. DOSE
MEAN =    5.847E+04
PERCENTILES :
     5-TH =    5.262E+04     50-TH =    5.794E+04     95-TH =    6.487E+04
```

C.4 LISTING OF RISQUE OUTPUT: CENTRAL ESTIMATE WITH CRAC2 CONSEQUENCES

```
1     BASE CASE:  PEACH BOTTOM LLH (C
      Specific information concerning input data follows :
      HEADER : CONS. BY CRAC2, SEQ BY TEMAC, ST BY RELTRAC

      SEQUENCES : P.B. SEQ. FREQS. FOR LALH: 1=TB,2=TBUX,3=TBU,4=TCSX,5=TCUX,6=TCSRX2,7=TCSRV23
      CONTAINMENT FAILURE MODES : PEACH BOTTOM CENTRAL - BASE & S.O. MASTER KEEP BIN FILE - 6 DEC 86
      RELEASES :  PEACH BOTTOM RELTRAC CENTRAL CLUSTER ASSIGNMENTS

      CONSEQUENCES : CONSEQUENCES BY CRAC2 12/08/86

      RESULTS ARE ABSOLUTE RISK PER YEAR



      BASE CASE OUTPUT WILL BE PRINTED
      SORTED MELTDOWN FREQUENCIES
      MEAN =     6.631E-06     VARIANCE =     0.000E+00



     CONSEQUENCE MEASURE:
      EARLY FATALITIES


      BASE CASE :
       PEACH BOTTOM LLH (CRAC2)



      MEAN =     1.340E-05     VARIANCE =     0.000E+00



    CONSEQUENCE MEASURE:
      EARLY FATALITIES


      BASE CASE :
       PEACH BOTTOM LLH (CRAC2)

      FRACTIONAL CONTRIBUTION OF EACH SEQUENCE TO MEAN RISK
                      SEQUENCE              CONTRIBUTION
                      TB                          0.0775
                      TBUX                        0.8925
                      TBU                         0.0297
                      TCSX                        0.0001
                      TCUX                        0.0000
                      TCSRX2                      0.0002
                      TCSRV23                     0.0000



    CONSEQUENCE MEASURE:
      EARLY FATALITIES


      BASE CASE :
       PEACH BOTTOM LLH (CRAC2)

      FRACTIONAL CONTRIBUTION OF EACH NONZERO BIN TO MEAN RISK
                      BIN                                        CONTRIBUTION
                      BAACACGBDAACBBBBHHABBB                        0.0001
                      DAAAACGBDDACBBBBHHABBB                        0.0002
                      EBAACCGGDDBCBABBEHABBB                        0.0297
                      EBACBCGGDCBCBABBFDABBA                        0.0001
                      EBACCCGGDDBCBABBFCBABB                        0.0529
                      EBACCCGGDDBCBABBFDABBB                        0.5093
                      EBACCCGGDDBCBADBFDABBB                        0.3301
                      FCACCCDGFDBCPADBEDABBB                        0.0091
                      FCACCCGGDDBCBABBECBABB                        0.0039
                      FCACCCGGDDBCBABBEDABBB                        0.0435
                      FCACCCGGDDBCBADBEDABBB                        0.0210
```

```
CONSEQUENCE MEASURE:
  EARLY FATALITIES

  BASE CASE :
   PEACH BOTTOM LLH (CRAC2)

  FRACTIONAL CONTRIBUTIONS OF EACH RELEASE TO MEAN RISK
                  RELEASE                 CONTRIBUTION
                  PCH  1I                       0.0000
                  PCH  2I                       0.0000
                  PCH  3I                       0.0001
                  PCH  4I                       0.0000
                  PCH  5I                       0.0000
                  PCH  6I                       0.0000
                  PCH  7I                       0.0000
                  PCH  8I                       0.0000
                  PCH  9I                       0.0000
                  PCH 10I                       0.0000
                  PCH 11I                       0.0000
                  PCH 12I                       0.0002
                  PCH 13I                       0.0000
                  PCH 14I                       0.0000
                  PCH 15I                       0.0000
                  PCH 16I                       0.0000
                  PCH 17I                       0.0000
                  PCH 18I                       0.0000
                  PCH 19I                       0.0000
                  PCH 20I                       0.0000
                  PCH 21I                       0.0000
                  PCH 22I                       0.0297
                  PCH 23I                       0.0000
                  PCH 24I                       0.0000
                  PCH 25I                       0.0000
                  PCH 26I                       0.0000
                  PCH 27I                       0.0000
                  PCH 28I                       0.0000
                  PCH 29I                       0.0001
                  PCH 30I                       0.0000
                  PCH 31I                       0.0000
                  PCH 32I                       0.0000
                  PCH 33I                       0.0000
                  PCH 34I                       0.0000
                  PCH 35I                       0.0000
                  PCH 36I                       0.0000
                  PCH 37I                       0.0000
                  PCH 38I                       0.0000
                  PCH 39I                       0.0000
                  PCH 40I                       0.0000
                  PCH 41I                       0.0000
                  PCH 42I                       0.0000
                  PCH 43I                       0.0000
                  PCH 44I                       0.0529
                  PCH 45I                       0.5093
                  PCH 46I                       0.0000
                  PCH 47I                       0.0000
                  PCH 48I                       0.3301
                  PCH 49I                       0.0000
                  PCH 50I                       0.0000
                  PCH 51I                       0.0000
                  PCH 52I                       0.0000
                  PCH 53I                       0.0000
                  PCH 54I                       0.0000
                  PCH 55I                       0.0000
                  PCH 56I                       0.0000
                  PCH 57I                       0.0000
                  PCH 58I                       0.0091
                  PCH 59I                       0.0000
                  PCH 60I                       0.0000
                  PCH 61I                       0.0000
                  PCH 62I                       0.0000
                  PCH 63I                       0.0039
                  PCH 64I                       0.0435
                  PCH 65I                       0.0000
                  PCH 66I                       0.0210
                  PCH 67I                       0.0000
                  PCH 68I                       0.0000
                  PCH 69I                       0.0000
                  PCH 70I                       0.0000
                  PCH 71I                       0.0000
                  PCH 72I                       0.0000
                  PCH 73I                       0.0000
                  PCH 74I                       0.0000
                  PCH 75I                       0.0000
                  PCH 76I                       0.0000
                  PCH 77I                       0.0000
```

```
1    CONSEQUENCE MEASURE:
     EARLY ILLNESS


     BASE CASE :
      PEACH BOTTOM LLH (CRAC2)


     MEAN =    2.667E-04     VARIANCE =    0.000E+00

   CONSEQUENCE MEASURE:
     EARLY ILLNESS


     BASE CASE :
      PEACH BOTTOM LLH (CRAC2)

     FRACTIONAL CONTRIBUTION OF EACH SEQUENCE TO MEAN RISK
                     SEQUENCE          CONTRIBUTION
                     TB                      0.4538
                     TBUX                    0.5359
                     TBU                     0.0100
                     TCSX                    0.0001
                     TCUX                    0.0000
                     TCSRX2                  0.0002
                     TCSRV23                 0.0000


   CONSEQUENCE MEASURE:
     EARLY ILLNESS


     BASE CASE :
      PEACH BOTTOM LLH (CRAC2)

     FRACTIONAL CONTRIBUTION OF EACH NONZERO BIN TO MEAN RISK
                     BIN                                   CONTRIBUTION
                     BAACACGBDAACBBBBHHABBB                      0.0001
                     DAAAACGBDDACBBBBHHABBB                      0.0002
                     EBAACCGGDDBCBABBEHABBB                      0.0100
                     EBACBBGGDCBCBABBFDABBA                      0.0001
                     EBACBCGGDCBCBABBFDABBA                      0.0001
                     EBACCCGGDDBCBABBFCBABB                      0.0278
                     EBACCCGGDDBCBABBFDABBB                      0.1715
                     EBACCCGGDDBCBADBFDABBB                      0.3363
                     FCACCCDGFDBCBADBEDABBB                      0.0010
                     FCACCCGGDDBCBABBECBABB                      0.0162
                     FCACCCGGDDBCBABBEDABBB                      0.2006
                     FCACCCGGDDBCBADBEDABBB                      0.2360
```

```
CONSEQUENCE MEASURE:
  EARLY ILLNESS

  BASE CASE :
   PEACH BOTTOM LLH (CRAC2)

  FRACTIONAL CONTRIBUTIONS OF EACH RELEASE TO MEAN RISK
                 RELEASE           CONTRIBUTION
                 PCH  1I                0.0000
                 PCH  2I                0.0000
                 PCH  3I                0.0001
                 PCH  4I                0.0000
                 PCH  5I                0.0000
                 PCH  6I                0.0000
                 PCH  7I                0.0000
                 PCH  8I                0.0000
                 PCH  9I                0.0000
                 PCH 10I                0.0000
                 PCH 11I                0.0000
                 PCH 12I                0.0002
                 PCH 13I                0.0000
                 PCH 14I                0.0000
                 PCH 15I                0.0000
                 PCH 16I                0.0000
                 PCH 17I                0.0000
                 PCH 18I                0.0000
                 PCH 19I                0.0000
                 PCH 20I                0.0000
                 PCH 21I                0.0000
                 PCH 22I                0.0100
                 PCH 23I                0.0000
                 PCH 24I                0.0000
                 PCH 25I                0.0000
                 PCH 26I                0.0001
                 PCH 27I                0.0000
                 PCH 28I                0.0000
                 PCH 29I                0.0001
                 PCH 30I                0.0000
                 PCH 31I                0.0000
                 PCH 32I                0.0000
                 PCH 33I                0.0000
                 PCH 34I                0.0000
                 PCH 35I                0.0000
                 PCH 36I                0.0000
                 PCH 37I                0.0000
                 PCH 38I                0.0000
                 PCH 39I                0.0000
                 PCH 40I                0.0000
                 PCH 41I                0.0000
                 PCH 42I                0.0000
                 PCH 43I                0.0000
                 PCH 44I                0.0278
                 PCH 45I                0.1715
                 PCH 46I                0.0000
                 PCH 47I                0.0000
                 PCH 48I                0.3363
                 PCH 49I                0.0000
                 PCH 50I                0.0000
                 PCH 51I                0.0000
                 PCH 52I                0.0000
                 PCH 53I                0.0000
                 PCH 54I                0.0000
                 PCH 55I                0.0000
                 PCH 56I                0.0000
                 PCH 57I                0.0000
                 PCH 58I                0.0010
                 PCH 59I                0.0000
                 PCH 60I                0.0000
                 PCH 61I                0.0000
                 PCH 62I                0.0000
                 PCH 63I                0.0162
                 PCH 64I                0.2006
                 PCH 65I                0.0000
                 PCH 66I                0.2360
                 PCH 67I                0.0000
                 PCH 68I                0.0000
                 PCH 69I                0.0000
                 PCH 70I                0.0000
                 PCH 71I                0.0000
                 PCH 72I                0.0000
                 PCH 73I                0.0000
                 PCH 74I                0.0000
                 PCH 75I                0.0000
                 PCH 76I                0.0000
                 PCH 77I                0.0000
```

```
1    CONSEQUENCE MEASURE:
     IND.RISK OF FATALITY


     BASE CASE :
      PEACH BOTTOM LLH (CRAC2)


     MEAN =    5.763E-09     VARIANCE =    0.000E+00


   CONSEQUENCE MEASURE:
     IND.RISK OF FATALITY


     BASE CASE :
      PEACH BOTTOM LLH (CRAC2)

     FRACTIONAL CONTRIBUTION OF EACH SEQUENCE TO MEAN RISK
                     SEQUENCE            CONTRIBUTION
                     TB                        0.0725
                     TBUX                      0.8885
                     TBU                       0.0350
                     TCSX                      0.0012
                     TCUX                      0.0000
                     TCSIX2                    0.0025
                     TCSRV23                   0.0003


    CONSEQUENCE MEASURE:
     IND.RISK OF FATALITY


     BASE CASE :
      PEACH BOTTOM LLH (CRAC2)

     FRACTIONAL CONTRIBUTION OF EACH NONZERO BIN TO MEAN RISK
                     BIN                                 CONTRIBUTION
                     BAACACGBDAACBBBBHHABBB                    0.0012
                     DAAAACGBDDACBBBBHHABBB                    0.0025
                     DABAACGADDACBBBBHGABAB                    0.0003
                     EBAACCGGDDBCBABBEHABBB                    0.0350
                     EBACBBGGDCBCBABBFDABBA                    0.0011
                     EBACBCGGDCBCBABBFDABBA                    0.0021
                     EBACCCGGDDBCBABBFCBABB                    0.0447
                     EBACCCGGDDBCBABBFDABBB                    0.5996
                     EBACCCGGDDBCAADBFDABBB                    0.2409
                     FCACCCDGFDBCBADBEDABBB                    0.0259
                     FCACCCGGDDBCBABBECBABB                    0.0034
                     FCACCCGGDDBCBABBEDABBB                    0.0338
                     FCACCCGGDDBCBADBEDABBB                    0.0095
```

BEST COPY AVAILABLE

379

```
CONSEQUENCE MEASURE:
 IND.RISK OF FATALITY


 BASE CASE :
  PEACH BOTTOM LLH (CRAC2)

 FRACTIONAL CONTRIBUTIONS OF EACH RELEASE TO MEAN RISK
                    RELEASE               CONTRIBUTION
                    PCH  1I                    0.0000
                    PCH  2I                    0.0000
                    PCH  3I                    0.0012
                    PCH  4I                    0.0000
                    PCH  5I                    0.0000
                    PCH  6I                    0.0000
                    PCH  7I                    0.0000
                    PCH  8I                    0.0000
                    PCH  9I                    0.0000
                    PCH 10I                    0.0000
                    PCH 11I                    0.0000
                    PCH 12I                    0.0025
                    PCH 13I                    0.0000
                    PCH 14I                    0.0000
                    PCH 15I                    0.0003
                    PCH 16I                    0.0000
                    PCH 17I                    0.0000
                    PCH 18I                    0.0000
                    PCH 19I                    0.0000
                    PCH 20I                    0.0000
                    PCH 21I                    0.0000
                    PCH 22I                    0.0350
                    PCH 23I                    0.0000
                    PCH 24I                    0.0000
                    PCH 25I                    0.0000
                    PCH 26I                    0.0011
                    PCH 27I                    0.0000
                    PCH 28I                    0.0000
                    PCH 29I                    0.0021
                    PCH 30I                    0.0000
                    PCH 31I                    0.0000
                    PCH 32I                    0.0000
                    PCH 33I                    0.0000
                    PCH 34I                    0.0000
                    PCH 35I                    0.0000
                    PCH 36I                    0.0000
                    PCH 37I                    0.0000
                    PCH 38I                    0.0000
                    PCH 39I                    0.0000
                    PCH 40I                    0.0000
                    PCH 41I                    0.0000
                    PCH 42I                    0.0000
                    PCH 43I                    0.0000
                    PCH 44I                    0.0447
                    PCH 45I                    0.5996
                    PCH 46I                    0.0000
                    PCH 47I                    0.0000
                    PCH 48I                    0.2409
                    PCH 49I                    0.0000
                    PCH 50I                    0.0000
                    PCH 51I                    0.0000
                    PCH 52I                    0.0000
                    PCH 53I                    0.0000
                    PCH 54I                    0.0000
                    PCH 55I                    0.0000
                    PCH 56I                    0.0000
                    PCH 57I                    0.0000
                    PCH 58I                    0.0259
                    PCH 59I                    0.0000
                    PCH 60I                    0.0000
                    PCH 61I                    0.0000
                    PCH 62I                    0.0000
                    PCH 63I                    0.0034
                    PCH 64I                    0.0338
                    PCH 65I                    0.0000
                    PCH 66I                    0.0095
                    PCH 67I                    0.0000
                    PCH 68I                    0.0000
                    PCH 69I                    0.0000
                    PCH 70I                    0.0000
                    PCH 71I                    0.0000
                    PCH 72I                    0.0000
                    PCH 73I                    0.0000
                    PCH 74I                    0.0000
                    PCH 75I                    0.0000
                    PCH 76I                    0.0000
                    PCH 77I                    0.0000
```

380

```
1     CONSEQUENCE MEASURE:
      LATENT CANCERS


      BASE CASE :
       PEACH BOTTOM LLH (CRAC2)


      MEAN =     8.716E-03     VARIANCE =     0.000E+00



     CONSEQUENCE MEASURE:
      LATENT CANCERS


      BASE CASE :
       PEACH BOTTOM LLH (CRAC2)

      FRACTIONAL CONTRIBUTION OF EACH SEQUENCE TO MEAN RISK
                     SEQUENCE           CONTRIBUTION
                     TB                       0.2403
                     TBUX                     0.7216
                     TBU                      0.0266
                     TCSX                     0.0027
                     TCUX                     0.0019
                     TCSRX2                   0.0059
                     TCSRV23                  0.0010


     CONSEQUENCE MEASURE:
      LATENT CANCERS


      BASE CASE :
       PEACH BOTTOM LLH (CRAC2)

      FRACTIONAL CONTRIBUTION OF EACH NONZERO BIN TO MEAN RISK
                     BIN                                   CONTRIBUTION
                     AAACACGGDABCBABBECABBB                   0.0019
                     BAACACGBDAACBBBBHHABBB                   0.0027
                     DAAAAAGBDABCBBBBHHABBB                   0.0007
                     DAAAACGBDDACBBBBHHABBB                   0.0053
                     DABAAAGADABCBCBBHGABAB                   0.0002
                     DABAACGADDACBBBBHGABAB                   0.0008
                     EBAACCGGDDBCBABBZHABBB                   0.0266
                     EBACBBGGDCBCBABBFDABBA                   0.0092
                     EBACBCGGDCBCBABBFDABBA                   0.0083
                     EBACCCFGFDBCBADBFDABBB                   0.0002
                     EBACCCFGFDBCBADBFDABBB                   0.0003
                     EBACCCGGDDBCBABBFCBABB                   0.0527
                     EBACCCGGDDBCBABBFDABBB                   0.4565
                     EBACCCGGDDBCBADBFDABBB                   0.1940
                     EBACCCGGEDBCBABBFDABBB                   0.0004
                     FCACCCDGFDBCBADBEDABBB                   0.0099
                     FCACCCGGDDBCBABBECBABB                   0.0150
                     FCACCCGGDDBCBABBEDABBB                   0.1513
                     FCACCCGGDDBCBADBEDABBB                   0.0639
                     FCCBAAGCFBBCCBBBHHABBB                   0.0001
```

```
CONSEQUENCE MEASURE:
 LATENT CANCERS


 BASE CASE :
  PEACH BOTTOM LLH (CRAC2)

 FRACTIONAL CONTRIBUTIONS OF EACH RELEASE TO MEAN RISK
              RELEASE              CONTRIBUTION
              PCH  1I                    0.0019
              PCH  2I                    0.0000
              PCH  3I                    0.0027
              PCH  4I                    0.0000
              PCH  5I                    0.0000
              PCH  6I                    0.0000
              PCH  7I                    0.0000
              PCH  8I                    0.0000
              PCH  9I                    0.0007
              PCH 10I                    0.0000
              PCH 11I                    0.0000
              PCH 12I                    0.0053
              PCH 13I                    0.0000
              PCH 14I                    0.0002
              PCH 15I                    0.0008
              PCH 16I                    0.0000
              PCH 17I                    0.0000
              PCH 18I                    0.0000
              PCH 19I                    0.0000
              PCH 20I                    0.0000
              PCH 21I                    0.0000
              PCH 22I                    0.0266
              PCH 23I                    0.0000
              PCH 24I                    0.0000
              PCH 25I                    0.0000
              PCH 26I                    0.0092
              PCH 27I                    0.0000
              PCH 28I                    0.0000
              PCH 29I                    0.0083
              PCH 30I                    0.0000
              PCH 31I                    0.0000
              PCH 32I                    0.0002
              PCH 33I                    0.0003
              PCH 34I                    0.0000
              PCH 35I                    0.0000
              PCH 36I                    0.0000
              PCH 37I                    0.0000
              PCH 38I                    0.0000
              PCH 39I                    0.0000
              PCH 40I                    0.0000
              PCH 41I                    0.0000
              PCH 42I                    0.0000
              PCH 43I                    0.0000
              PCH 44I                    0.0527
              PCH 45I                    0.4565
              PCH 46I                    0.0000
              PCH 47I                    0.0000
              PCH 48I                    0.1940
              PCH 49I                    0.0000
              PCH 50I                    0.0004
              PCH 51I                    0.0000
              PCH 52I                    0.0000
              PCH 53I                    0.0000
              PCH 54I                    0.0000
              PCH 55I                    0.0000
              PCH 56I                    0.0000
              PCH 57I                    0.0000
              PCH 58I                    0.0099
              PCH 59I                    0.0000
              PCH 60I                    0.0000
              PCH 61I                    0.0000
              PCH 62I                    0.0000
              PCH 63I                    0.0150
              PCH 64I                    0.1513
              PCH 65I                    0.0000
              PCH 66I                    0.0639
              PCH 67I                    0.0000
              PCH 68I                    0.0000
              PCH 69I                    0.0000
              PCH 70I                    0.0000
              PCH 71I                    0.0000
              PCH 72I                    0.0000
              PCH 73I                    0.0000
              PCH 74I                    0.0000
              PCH 75I                    0.0001
              PCH 76I                    0.0000
```

```
CONSEQUENCE MEASURE:
POP. DOSE 50 MI.


BASE CASE :
 PEACH BOTTOM LLH (CRAC2)



MEAN =    5.321E+01     VARIANCE =    0.000E+00




CONSEQUENCE MEASURE:
 POP. DOSE 50 MI.


 BASE CASE :
  PEACH BOTTOM LLH (CRAC2)

 FRACTIONAL CONTRIBUTION OF EACH SEQUENCE TO MEAN RISK
                SEQUENCE            CONTRIBUTION
                TB                        0.2191
                TBUX                      0.7417
                TBU                       0.0290
                TCSX                      0.0022
                TCUX                      0.0023
                TCSRX2                    0.0045
                TCSRV23                   0.0011


CONSEQUENCE MEASURE:
  POP. DOSE 50 MI.


  BASE CASE :
   PEACH BOTTOM LLH (CRAC2)

  FRACTIONAL CONTRIBUTION OF EACH NONZERO BIN TO MEAN RISK
                  BIN                                CONTRIBUTION
                  AAACACGGDABCBABBECABBB                0.0023
                  BAACACGBDAACBBBBHHABBB                0.0022
                  DAAAAAGBDABCBBBBHHABBB                0.0007
                  DAAAACGBDDACBBBBHHABBB                0.0039
                  DABAAAGADABCBBBBHGABAB                0.0002
                  DABAACGADDACBBBBHGABAB                0.0009
                  EBAACCGGDDBCBABBEHABBB                0.0290
                  EBACBBGGDCBCBABBFDABBA                0.0072
                  EBACBCGGDCBCBABBFDABBA                0.0064
                  EBACCCFGFDBCBABBFDABBB                0.0002
                  EBACCCFGFDBCBADBFDABBB                0.0004
                  EBACCCGGDDBCBABBFCBABB                0.0571
                  EBACCCGGDDBCBABBFDABBB                0.4967
                  EBACCCGGDDBCBADBFDABBB                0.1732
                  EBACCCGGEDBCBABBFDABBB                0.0005
                  FCACCCDGFDBCBADBEDABBB                0.0102
                  FCACCCGGDDBCBABBECBABB                0.0145
                  FCACCCGGDDBCBABBEDABBB                0.1446
                  FCACCCGGDDBCBADBEDABBB                0.0497
                  FCCBAAGCFBBCCBBBHHABBB                0.0001
```

```
CONSEQUENCE MEASURE:
  POP. DOSE 50 MI.

  BASE CASE :
   PEACH BOTTOM LLH (CRAC2)

  FRACTIONAL CONTRIBUTIONS OF EACH RELEASE TO MEAN RISK
                 RELEASE              CONTRIBUTION
                 PCH  1I                    0.0023
                 PCH  2I                    0.0000
                 PCH  3I                    0.0022
                 PCH  4I                    0.0000
                 PCH  5I                    0.0000
                 PCH  6I                    0.0000
                 PCH  7I                    0.0000
                 PCH  8I                    0.0000
                 PCH  9I                    0.0007
                 PCH 10I                    0.0000
                 PCH 11I                    0.0000
                 PCH 12I                    0.0039
                 PCH 13I                    0.0000
                 PCH 14I                    0.0002
                 PCH 15I                    0.0009
                 PCH 16I                    0.0000
                 PCH 17I                    0.0000
                 PCH 18I                    0.0000
                 PCH 19I                    0.0000
                 PCH 20I                    0.0000
                 PCH 21I                    0.0000
                 PCH 22I                    0.0290
                 PCH 23I                    0.0000
                 PCH 24I                    0.0000
                 PCH 25I                    0.0000
                 PCH 26I                    0.0072
                 PCH 27I                    0.0000
                 PCH 28I                    0.0000
                 PCH 29I                    0.0064
                 PCH 30I                    0.0000
                 PCH 31I                    0.0000
                 PCH 32I                    0.0002
                 PCH 33I                    0.0004
                 PCH 34I                    0.0000
                 PCH 35I                    0.0000
                 PCH 36I                    0.0000
                 PCH 37I                    0.0000
                 PCH 38I                    0.0000
                 PCH 39I                    0.0000
                 PCH 40I                    0.0000
                 PCH 41I                    0.0000
                 PCH 42I                    0.0000
                 PCH 43I                    0.0000
                 PCH 44I                    0.0571
                 PCH 45I                    0.4967
                 PCH 46I                    0.0000
                 PCH 47I                    0.0000
                 PCH 48I                    0.1732
                 PCH 49I                    0.0000
                 PCH 50I                    0.0005
                 PCH 51I                    0.0000
                 PCH 52I                    0.0000
                 PCH 53I                    0.0000
                 PCH 54I                    0.0000
                 PCH 55I                    0.0000
                 PCH 56I                    0.0000
                 PCH 57I                    0.0000
                 PCH 58I                    0.0102
                 PCH 59I                    0.0000
                 PCH 60I                    0.0000
                 PCH 61I                    0.0000
                 PCH 62I                    0.0000
                 PCH 63I                    0.0145
                 PCH 64I                    0.1446
                 PCH 65I                    0.0000
                 PCH 66I                    0.0497
                 PCH 67I                    0.0000
                 PCH 68I                    0.0000
                 PCH 69I                    0.0000
                 PCH 70I                    0.0000
                 PCH 71I                    0.0000
                 PCH 72I                    0.0000
                 PCH 73I                    0.0000
                 PCH 74I                    0.0000
                 PCH 75I                    0.0001
                 PCH 76I                    0.0000
                 PCH 77I                    0.0000
```

```
1    CONSEQUENCE MEASURE:
     PROPERTY DAMAGE


     BASE CASE :
      PEACH BOTTOM LLH (CRAC2)


     MEAN =    9.406E+02     VARIANCE =    0.000E+00


   CONSEQUENCE MEASURE:
     PROPERTY DAMAGE


     BASE CASE :
      PEACH BOTTOM LLH (CRAC2)

     FRACTIONAL CONTRIBUTION OF EACH SEQUENCE TO MEAN RISK
                    SEQUENCE            CONTRIBUTION
                    TB                        0.2910
                    TBUX                      0.6765
                    TBU                       0.0222
                    TCSX                      0.0022
                    TCUX                      0.0017
                    TCSRX2                    0.0054
                    TCSRV23                   0.0009


    CONSEQUENCE MEASURE:
     PROPERTY DAMAGE


     BASE CASE :
      PEACH BOTTOM LLH (CRAC2)

     FRACTIONAL CONTRIBUTION OF EACH NONZERO BIN TO MEAN RISK
                   BIN                                     CONTRIBUTION
                   AAACACGGDABCBABBECABBB                      0.0017
                   BAACACGBDAACBBBBHHABBB                      0.0022
                   DAAAAAGBDABCBBBBHHABBB                      0.0005
                   DAAAACGBDDACBBBBHHABBB                      0.0050
                   DABAAAGADABCBBBBHGABAB                      0.0002
                   DABAACGADDACBBBBHGABAB                      0.0007
                   EBAACCGGDDBCBABBEHABBB                      0.0222
                   EBACBBGGDCBCBABBFDABBA                      0.0132
                   EBACBCGGDCBCBABBFDABBA                      0.0110
                   EBACCCFGFDBCBABBFDABBB                      0.0003
                   EBACCCFGFDBCBADBFDABBB                      0.0004
                   EBACCCGGDDBCBABBFCBABB                      0.0429
                   EBACCCGGDDBCBABBFDABBB                      0.3813
                   EBACCCGGDDBCBADBFDABBB                      0.2273
                   EBACCCGGEDBCBABBFDABBB                      0.0003
                   FCACCCDGFDBCBADBEDABBB                      0.0140
                   FCACCCGGDDBCBABBECBABB                      0.0149
                   FCACCCGGDDBCBABBEDABBB                      0.1519
                   FCACCCGGDDBCBADBEDABBB                      0.1099
                   FCBBACGEFBBCCABBEGABBB                      0.0001
                   FCCBAAGCFBBCCBBBHHABBB                      0.0002
```

```
CONSEQUENCE MEASURE:
 PROPERTY DAMAGE


 BASE CASE :
  PEACH BOTTOM LLH (CRAC2)

 FRACTIONAL CONTRIBUTIONS OF EACH RELEASE TO MEAN RISK
               RELEASE             CONTRIBUTION
               PCH  1I                   0.0017
               PCH  2I                   0.0000
               PCH  3I                   0.0022
               PCH  4I                   0.0000
               PCH  5I                   0.0000
               PCH  6I                   0.0000
               PCH  7I                   0.0000
               PCH  8I                   0.0000
               PCH  9I                   0.0005
               PCH 10I                   0.0000
               PCH 11I                   0.0000
               PCH 12I                   0.0050
               PCH 13I                   0.0000
               PCH 14I                   0.0002
               PCH 15I                   0.0007
               PCH 16I                   0.0000
               PCH 17I                   0.0000
               PCH 18I                   0.0000
               PCH 19I                   0.0000
               PCH 20I                   0.0000
               PCH 21I                   0.0000
               PCH 22I                   0.0222
               PCH 23I                   0.0000
               PCH 24I                   0.0000
               PCH 25I                   0.0000
               PCH 26I                   0.0132
               PCH 27I                   0.0000
               PCH 28I                   0.0000
               PCH 29I                   0.0110
               PCH 30I                   0.0000
               PCH 31I                   0.0000
               PCH 32I                   0.0003
               PCH 33I                   0.0004
               PCH 34I                   0.0000
               PCH 35I                   0.0000
               PCH 36I                   0.0000
               PCH 37I                   0.0000
               PCH 38I                   0.0000
               PCH 39I                   0.0000
               PCH 40I                   0.0000
               PCH 41I                   0.0000
               PCH 42I                   0.0000
               PCH 43I                   0.0000
               PCH 44I                   0.0429
               PCH 45I                   0.3813
               PCH 46I                   0.0000
               PCH 47I                   0.0000
               PCH 48I                   0.2273
               PCH 49I                   0.0000
               PCH 50I                   0.0003
               PCH 51I                   0.0000
               PCH 52I                   0.0000
               PCH 53I                   0.0000
               PCH 54I                   0.0000
               PCH 55I                   0.0000
               PCH 56I                   0.0000
               PCH 57I                   0.0000
               PCH 58I                   0.0140
               PCH 59I                   0.0000
               PCH 60I                   0.0000
               PCH 61I                   0.0000
               PCH 62I                   0.0000
               PCH 63I                   0.0149
               PCH 64I                   0.1519
               PCH 65I                   0.0000
               PCH 66I                   0.1099
               PCH 67I                   0.0000
               PCH 68I                   0.0000
               PCH 69I                   0.0000
               PCH 70I                   0.0000
               PCH 71I                   0.0000
               PCH 72I                   0.0001
               PCH 73I                   0.0000
               PCH 74I                   0.0000
               PCH 75I                   0.0002
               PCH 76I                   0.0000
               PCH 77I                   0.0000
```

```
1       COSTS OF MELTDOWN ACCIDENTS
      ANNUAL OFFSITE COSTS AS THE SUM OF :
      PROP. DAM., 1E6*EARLY FAT., 1.E5*ILLNESS, AND 1.E5*LATENT CANCERS
      MEAN =    1.852E+03
      PERCENTILES :
           5-TH =    1.852E+03     50-TH =    1.852E+03     95-TH =    1.852E+03

      ANNUAL OFFSITE COST AS 1E3*POP. DOSE
      MEAN =    3.547E+04
      PERCENTILES :
           5-TH =    5.321E+04     50-TH =    5.321E+04     95-TH =    5.321E+04

      ANNUAL ONSITE COSTS :
      MEAN =    1.754E+04
      PERCENTILES :
           5-TH =    1.168E+04     50-TH =    1.700E+04     95-TH =    2.393E+04


      TOTAL COSTS BASED ON SUMMED OFFSITE COSTS
      MEAN =    1.939E+04
      PERCENTILES :
           5-TH =    1.353E+04     50-TH =    1.885E+04     95-TH =    2.579E+04

      TOTAL COSTS BASED ON 1E3*POP. DOSE
      MEAN =    5.301E+04
      PERCENTILES :
           5-TH =    4.715E+04     50-TH =    5.247E+04     95-TH =    5.940E+04
```

C.5 STATISTICAL ANALYSIS OF PEACH BOTTOM RESULTS

As described previously, the LLH issues for Peach Bottom can be considered in three groups: front-end sequence issues, containment event tree issues, and source term issues. Each issue was represented by two to nine distinct levels which were intended to cover the range of expected uncertainty. For reference, the issues are listed below:

Sequence Frequency Issues

(1) Probability of failure to actuate the standby liquid control system (4 levels)
(2) Frequency of dc power system common mode (4 levels)
(3) Probability of failure to vent during an ATWS (4 levels)
(4) Power recovery uncertainties (4 levels)

Containment Analysis Uncertainties

(1) Probability of a stuck-open tailpipe vacuum breaker (4 levels)
(2) Use of the high-pressure service water system spray as a recovery (4 levels)
(3) Probability that the operations staff fails to vent containment during a station blackout (4 levels)
(4) Probability that the operations staff fails to vent containment following the recovery of ac power (4 levels)
(5) Size of bypass due to stuck-open tailpipe vacuum breaker (2 levels)
(6) Containment failure pressure and location of failure (9 levels)
(7) Containment failure size (2 levels)
(8) Failure mode of the reactor pressure vessel (2 levels)
(9) Containment pressure prior to vessel breach for station blackout (4 levels)
(10) Pressure rise at vessel breach (5 levels)
(11) Probability of drywell meltthrough (2 levels)
(12) Probability of hydrogen burns sufficient to cause reactor building bypass (2 levels)

Source Term Uncertainties

(1) Magnitude of in-vessel release from the fuel (4 levels)
(2) Amount of CsI decomposition in the RPV (4 levels)
(3) Amount of RPV retention (4 levels)
(4) Suppression pool decontamination factor for aerosols (5 levels)
(5) Suppression pool scrubbing of volatile iodine (5 levels)
(6) Revolatilization of iodine and cesium from vessel following vessel breach (4 levels)
(7) Releases from the melt during core-concrete interactions (4 levels)

(8) Reactor building and refueling bay decontamination factors (4 levels)
(9) Late releases of iodine from the suppression pool (4 levels)

Each level within an issue was assigned a weight such that the weights summed to 1.0. This is equivalent to creating discrete probability distributions for each issue. These probability distributions were input into the Latin hypercube sampling program which used them to generate a Latin hypercube sample (LHS) of size n = 150. The LHS program samples the levels of each issue according to the weight assigned to the levels. For example, if a particular level of an issue has weight 0.1, then that level will appear 0.1 (n), or 15 times in our sample of 150. Clearly only a small fraction of the total number of combinations of levels for all of the issues is represented in the sample of 150. The LHS program pairs the levels selected for the various issues in such a way as to minimize correlations between pairs of issues. This allows the subsequent regression analysis to provide a clear indication of the important issues without the decision being clouded by spurious correlations with other issues. However, it is not possible to keep all pairwise correlations equal to identically zero, and the multivariate structure of the issues (i.e., the correlations among issues) must be kept in mind when performing the regression analysis.

The 150 input vectors containing the levels of the issues are used as input to each of the models in the PRA process. The MACCS model is the final model in the PRA process and it is used to generate six consequences for all of the LLH sample members. (The discussion in this section is based solely on the MACCS results.) The six consequences considered here are early fatality, early illness, individual risk of death, latent cancer fatality, population dose and property damage.

C.5.1 Regression Analysis of LLH Issues

A regression analysis was used to determine which of the uncertainty issues have a significant impact on the consequences calculated by MACCS, and to provide a relative ordering of those issues. The regression analysis proceeds by considering a linear model of the form:

$$y = \beta_0 + \underbrace{\beta_1 D_1 + \beta_2 D_2 + \beta_3 D_3}_{\text{[First LLH issue]}} + \underbrace{\beta_4 D_4 + \beta_5 D_5 + \beta_6 D_6}_{\text{[Second LLH issue]}} + \underbrace{\beta_7 D_7 + \beta_8 D_8 + \beta_9 D_9}_{\text{[Third LLH issue]}} \qquad (1)$$

$$\ldots + \underbrace{\beta_{82} D_{82} + \beta_{83} D_{83} + \beta_{84} D_{84}}_{\text{[Last LLH issue]}}$$

The D_i in the equation are dummy variables used to denote the absence ($D_i = 0$) or the presence ($D_i = 1$) of a particular level of a particular issue within a particular sample vector. To illustrate the role of dummy variables in the model, consider a simpler model for only one issue:

$$y = \beta_0 + \beta_1 D_1 + \beta_2 D_2 + \beta_3 D_3 \qquad (2)$$

Since this issue occurs at four levels, three dummy variables are utilized to represent the different levels as follows:

Level	D_1	D_2	D_3	Model
1	0	0	0	$y = \beta_0$
2	1	0	0	$y = \beta_0 + \beta_1 D_1$
3	0	1	0	$y = \beta_0 + + \beta_2 D_2$
4	0	0	1	$y = \beta_0 + \beta_3 D_3$

Thus β_1 in Equation (2) represents the change in the response variable when going from level 1 of issue 1 to level 2 of issue 1. Likewise, β_2 and β_3 respectively represent the change in response variable when going from level 1 of issue 1 to level 3 of issue 1 and from level 1 of issue 1 to level 4 of issue 1. In the larger model in Equation (1), β_1 represents the change in the response variable when going from level 1 of issue 1 to level 2 of issue 1, given that all of the other issues are fixed at their first levels.

The MACCS output variable early fatalities (y) will be used to illustrate how the model in Equation (1) is used to rank the sensitivity issues. The total sum of the squares (in rank regression space with $n = 150$) for y is 281,237.5 (details of the analysis are not shown). The sum of the squares accounted for by the model in Equation (1) (i.e., the model sum of squares) is 245,742.9. Thus the model in Equation (1) explains 87.4% of the total variation (in rank space) for early fatalities.

To measure the impact of issue 2 on early fatalities, the terms in Equation 1 used to identify the levels of issue 2 (i.e., $\beta_4 D_4$,$\beta_5 D_5$ and $\beta_6 D_6$) are dropped from the model. Without these terms, the model sum of squares must decrease. The amount of decrease in the model sum of squares is 13,552.5. Hence the fraction of the total variance (again in rank space) uniquely explained by issue 2 is 4.8% (13,552.5/281,237.5). A F statistic with the appropriate degrees of freedom is used to determine if a reduction of 13,552.5 in the model sum of squares is significant at the 0.05 level of significance. Similar calculations can be made for each of the other issues represented in the model in Equation (1).

Using this methodology, only 12 of the issues were identified as having a significant impact on the six consequence measures considered. These issues found to have a significant impact are listed below:

Sequence Frequency Issues

(1) Probability of failure to actuate the standby liquid control system
(2) Frequency of Dc power system common mode
(4) Power recovery uncertainties

Containment Analysis Uncertainties

(5) Size of bypass due to stuck-open tailpipe vacuum breaker
(8) Failure mode of the reactor pressure vessel
(11) Probability of drywell meltthrough
(12) Probability of hydrogen burns sufficient to cause reactor building bypass

Source Term Uncertainties

(4) Suppression pool decontamination factor for aerosols
(6) Revolatilization of iodine and cesium from vessel following vessel breach
(7) Releases from the melt during core-concrete interactions
(8) Reactor building and refueling bay decontamination factors
(9) Late releases of iodine from the suppression pool

The results of the regression analysis with the model in Equation (1) are displayed in Figures C-1 through C-6 for the six MACCS consequence measures considered. The issues that affect a particular consequence are identified by a vertical bar in the graph, where the height of the bar represents the fraction of the total variance (in rank space) uniquely explained by the issue as illustrated in the above calculation for issue 2. Thus the height of the bar in Figure C-1 for the second issue represents 4.8%. For ease of comparison, the same vertical scale is used on all graphs.

As described in Section 2 of the main report, the RISQUE code includes a calculation of rank regression. It was possible in this analysis to perform a more detailed rank regression reported in this section. The original method of rank regression is compared to this method in Section 5 of the main report. The complete listing of the RISQUE rank-regression results are listed in Section C.1 and C.2 of this appendix.

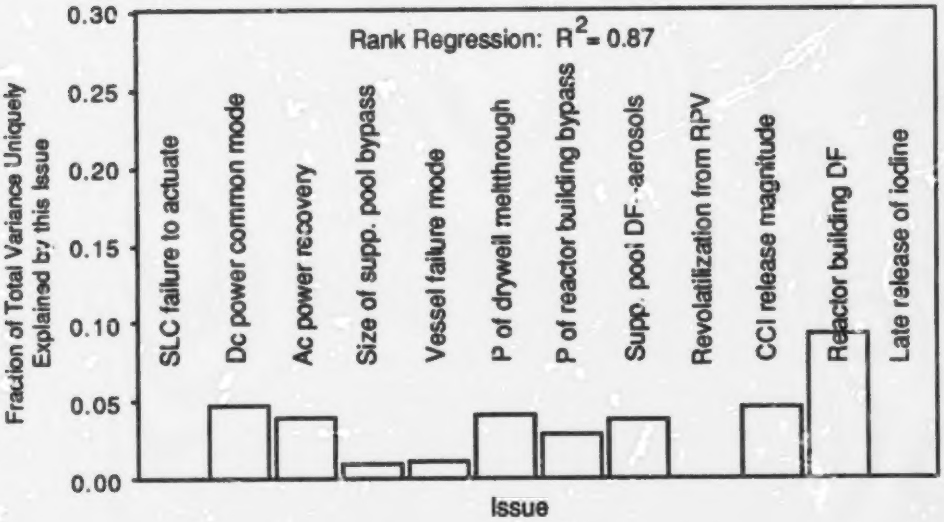

Figure C-1. Rank Regression of Issues Significantly Affecting the Uncertainty in the Risk of Early Fatality

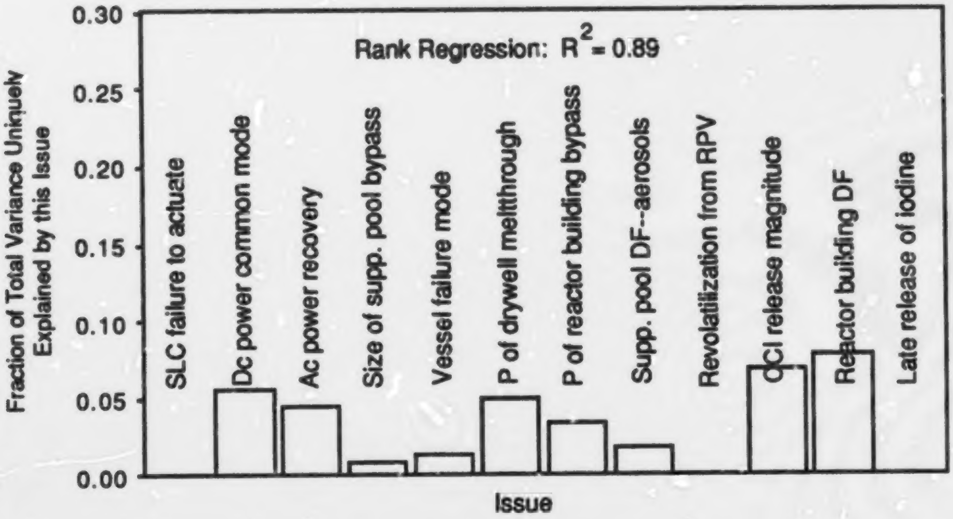

Figure C-2. Rank Regression of Issues Significantly Affecting the Uncertainty in the Risk of Early Illness

BEST COPY AVAILABLE

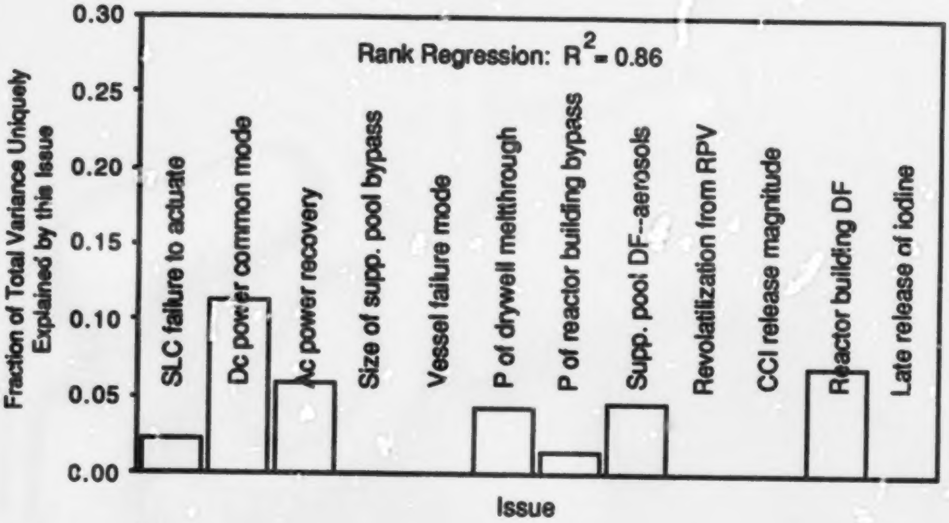

Figure C-3. Rank Regression of Issues Significantly Affecting the Uncertainty in the Individual Risk of Fatality

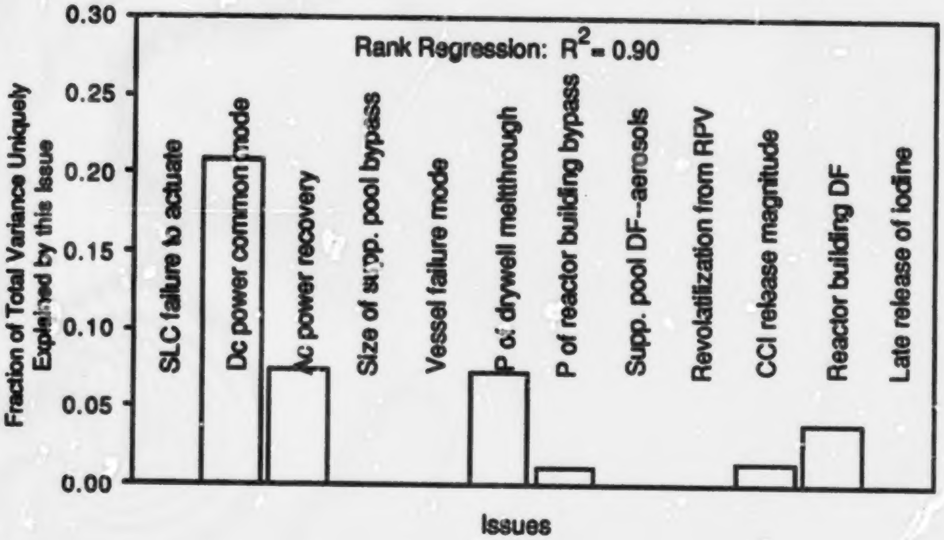

Figure C-4. Rank Regression of Issues Significantly Affecting the Uncertainty in the Risk of Latent Cancer Fatality

BEST COPY AVAILABLE

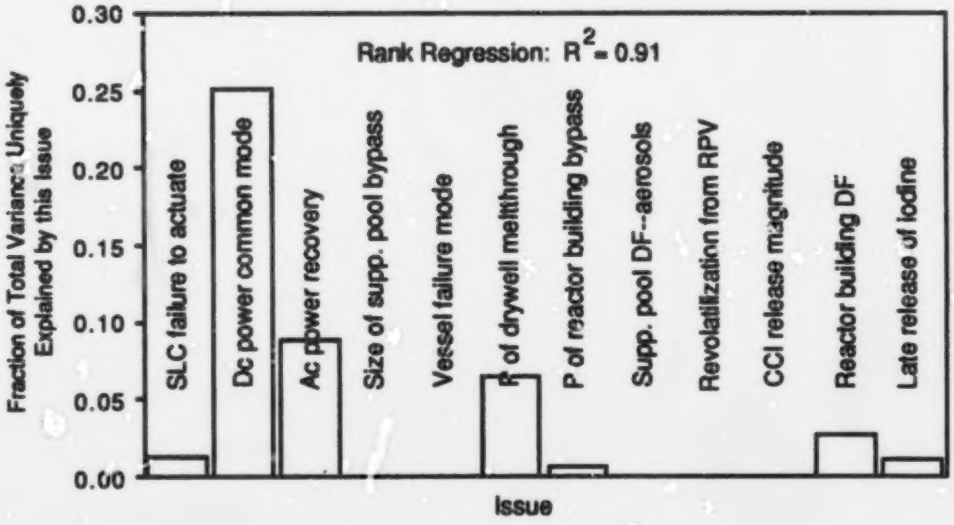

Figure C-5. Rank Regression of Issues Significantly Affecting the Uncertainty in the Population Dose Risk Measure

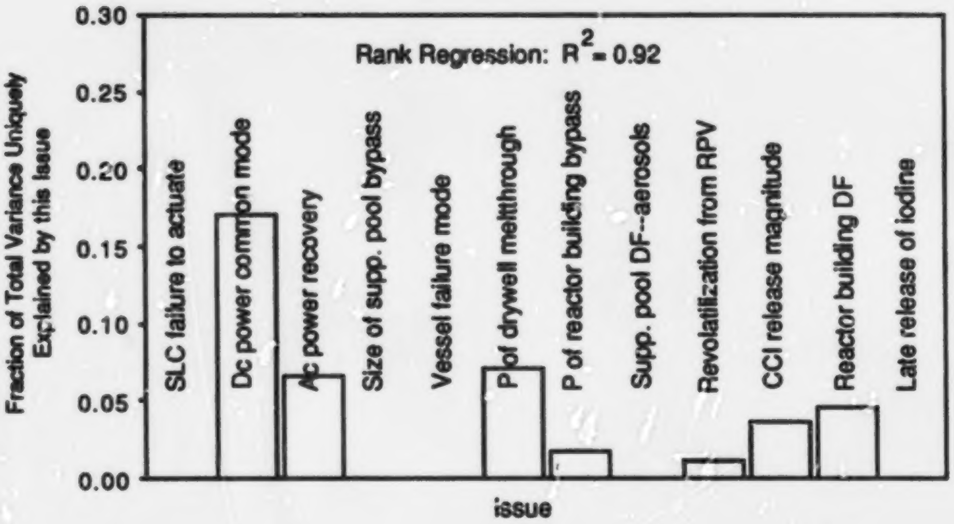

Figure C-6. Rank Regression of Issues Significantly Affecting the Uncertainty in the Property Damage Risk Measure

394

C.5.2 Statistical Analysis of the Levels of the Significant LLH Issues

The regression analysis in the previous section identified the significant issues for each of the MACCS consequences. Given that an issue is significant, a second regression analysis can be used to identify those levels within an issue that differ from the first level of the issue. As shown in Equation (1), the different levels of the issues are associated with different terms in the model in Equation (1). For example, issues 2 and 4 of the sequence frequency group each have four levels and are associated with the following terms in the model in Equation (1):

Sequence issue 2 $\beta_4 D_4 + \beta_5 D_5 + \beta_6 D_6$

Sequence issue 4 $\beta_{10} D_{10} + \beta_{11} D_{11} + \beta_{12} D_{12}$

The regression analysis on levels proceeds by forming a reduced version of the model in Equation (1) for each MACCS consequence. In each case, the reduced model contains only those terms corresponding to issues that the previous regression indicated to be significant. For example, the reduced model for early fatalities involves nine significant issues (see Figure C-1) and is written as follows:

$$y = \beta_0 + \underbrace{\beta_4 D_4 + \beta_5 D_5 + \beta_6 D_6}_{\text{[Fourth LLH issue]}} + \underbrace{\beta_{10} D_{10} + \beta_{11} D_{11} + \beta_{12} D_{12}}_{\text{[Second LLH issue]}} + \qquad (3)$$

$$\ldots + \underbrace{\beta_{76} D_{76} + \beta_{77} D_{77} + \beta_{78} D_{78}}_{\text{[Last significant LLH issue for early fatalities]}}$$

The regression analysis with the model in Equation (3) can be used to determine if each of the additional levels for an issue differ significantly from the first level over all issues. For example, if the regression analysis indicates that the β_j (i.e., the coefficient) is significantly different from zero in equation (3), then a significant change in the consequences occurs when the level corresponding to β_j is utilized versus all issues being set at their first level. The analysis on the model in Equation (3) identifies the following levels as having significant impact:

Sequence Frequency Issues	Levels Identified as Significantly Different From Level 1 of the Issue
(1) Probability of failure to actuate the SLC	4
(2) Frequency of dc power system common mode	3 & 4
(4) Power recovery uncertainties	2, 3, &4
Containment Analysis Uncertainties	
(5) Size of bypass--stuck-open tailpipe vacuum breaker	None

(8)	Failure mode of the reactor pressure vessel	2
(11)	Probability of drywell meltthrough	2
(12)	Probability of reactor building bypass	2

Source Term Uncertainties

(4)	Suppression pool decontamination factor for aerosols	5
(6)	Revolatilization from vessel following vessel breach	4
(7)	Releases from the melt during CCI	2, 3, &4
(8)	Reactor building and refueling bay DFs	3 & 4
(9)	Late releases of iodine from the suppression pool	None

The results of the regression analysis on levels of issues are shown in Figures C-7 through C-12 corresponding to the six consequences depicted respectively in Figures C-1 through C-6. The bar heights in these figures represent the standardized regression coefficients of the terms in Equation (3) identified as significantly different from zero at the 0.05 level. The heights of the bars can be used to provide a relative ordering of the significant levels.

It should be noted that the regression analysis has provided a comparison of each level against only the first level. It does not provide a comparison between say levels 2 and 3 of a particular issue, rather it indicates if level 2 differs from level 1 and if level 3 differs from level 1. Additional regression analyses utilizing the model defined in equation 3 with a different set of dummy variables could yield the comparison of all levels with each other to provide additional perspective.

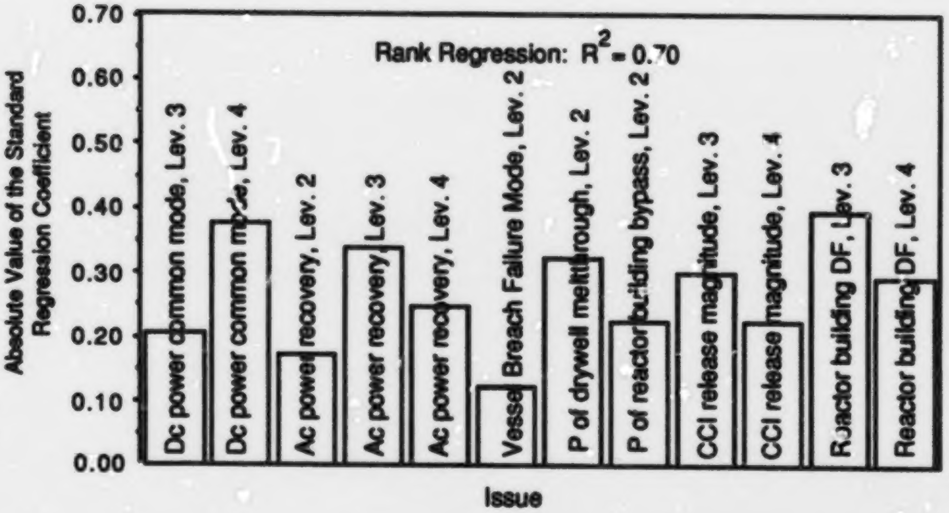

Figure C-7. Rank Regression of Levels of Issues Significantly Affecting the Uncertainty in the Risk of Early Fatality

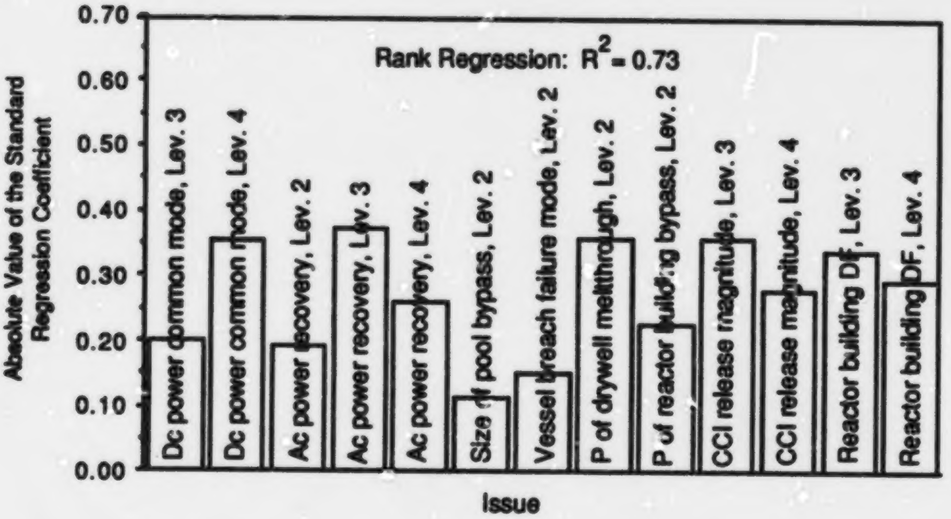

Figure C-8. Rank Regression of Levels of Issues Significantly Affecting the Uncertainty in the Individual Risk of Fatality

BEST COPY AVAILABLE

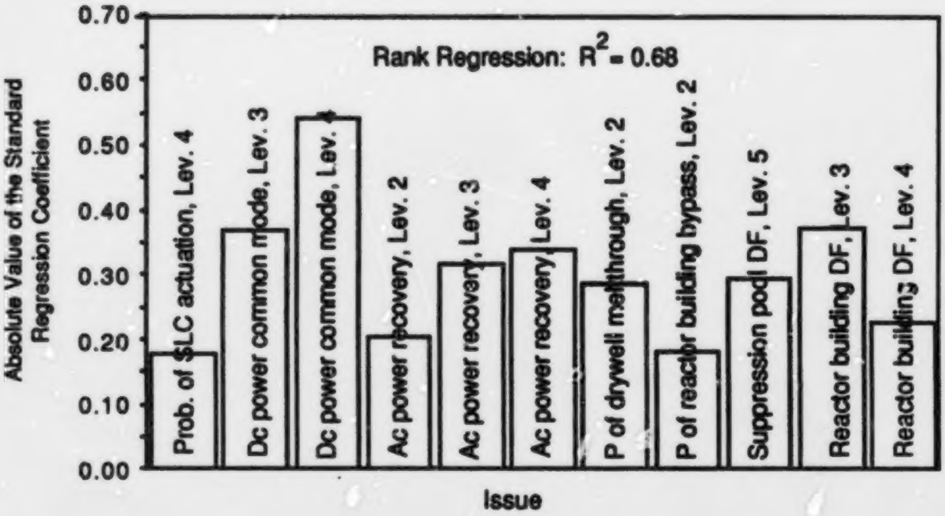

Figure C-9. Rank Regression of Levels of Issues Significantly Affecting the Uncertainty in the Individual Risk of Fatality

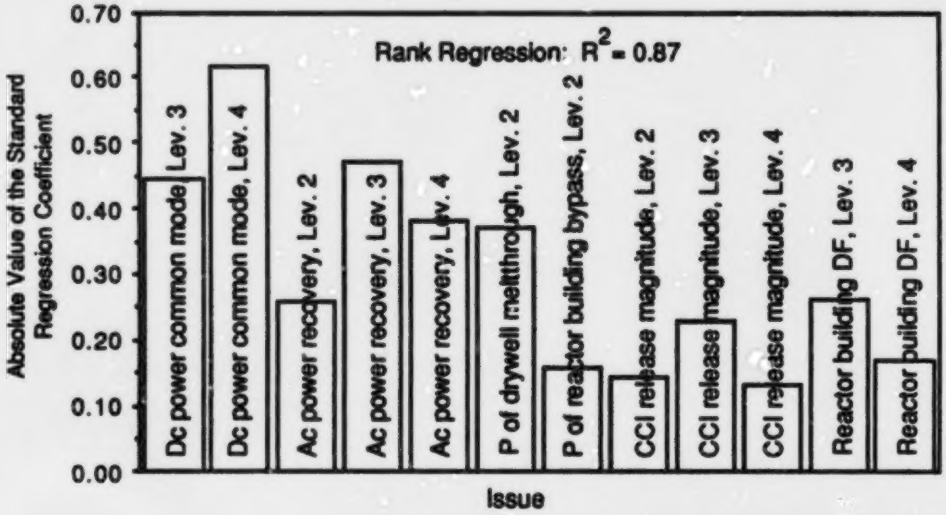

Figure C-10. Rank Regression of Levels of Issues Significantly Affecting the Uncertainty in the Risk of Latent Cancer Fatality

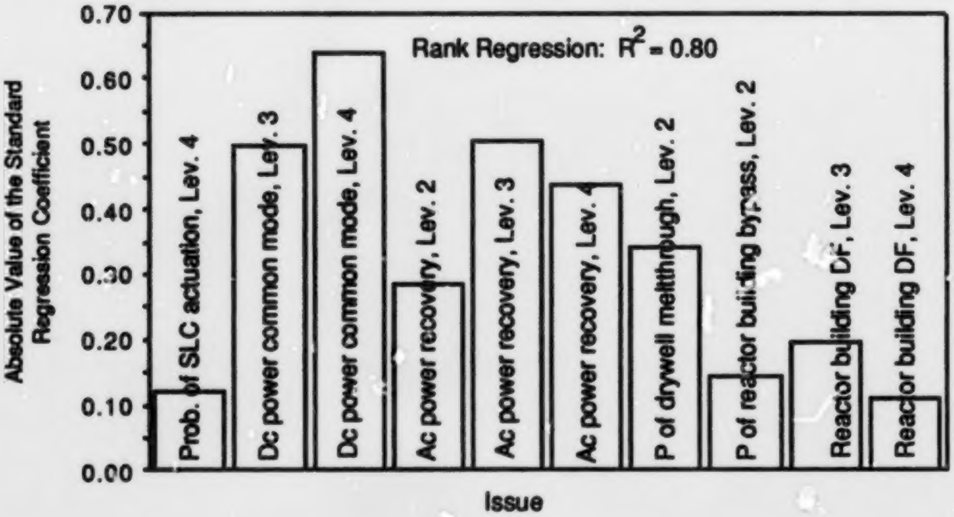

Figure C-11. Rank Regression of Levels of Issues Significantly Affecting the Uncertainty in the Population Dose Risk Measure

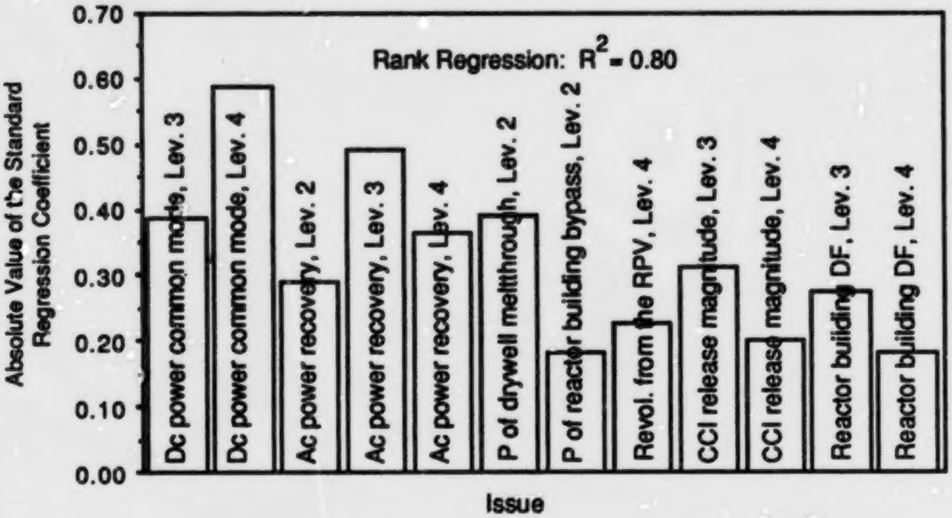

Figure C-12. Rank Regression of Levels of Issues Significantly Affecting the Uncertainty in the Property Damage Risk Measure

Appendix D
ASSESSMENT OF RISK-REDUCTION MEASURES

400

CONTENTS

Section Page

D.1 SUMMARY OF SAFETY OPTIONS EVALUATED.......... D-1 -403

D.1.1 Description of Accident-Prevention Options.......... D-2 -404

D.1.2 Description of Mitigative Options.......... D-4 -406

D.2 EVALUATION OF EFFECTS ON RISK MEASURES.......... D-6 -408

D.2.1 Effect of the Preventative Options on the Core-Damage Frequency.......... D-7 -409

D.2.2 Effect of Mitigative Options on the Containment Response.......... D-8 -410

D.2.3 Effects of Safety Options on Risk.......... D-12-414

D.3 ASSESSMENT OF IMPACT FOR RISK-REDUCTION MEASURES.......... D-15-417

D.3.1 Estimated Costs of Risk-Reduction Measures.......... D-16-418

D.3.2 Estimated Personnel Doses Due to the Risk-Reduction Measures.......... D-16

D.3.3 Insights Concerning Replacement Power.......... D-20-422

D.4 COSTS VERSUS BENEFITS.......... D-20

LIST OF TABLES

Table Page

D-1 Impact of Accident-Prevention Options on Core-Damage Frequency D-7
D-2 Comparison of LLH Base Case and Mitigation Options: Contribution of Accident-Progression Bins for Early Fatalities (MACCS) D-10
D-3 Comparison of LLH Base Case and Mitigation Options: Contribution of Accident-Progression Bins for Latent Cancer Fatalities (MACCS) D-11
D-4 Estimated One-Time Cost for Risk-Reduction Measures D-17
D-5 Estimated Continuing Costs for Risk-Reduction Measures D-18
D-6 Estimated Total Cost of Risk-Reduction Measures (Present Value) D-19
D-7 Estimated Dose for Implementation of Risk-Reduction Measures D-20
D-8 Estimated Replacement Power Times for Risk-Reduction Measures D-22
D-9 Detailed LLH Cost-Benefit Comparisons: MACCS Consequences D-26
D-10 Detailed LLH Cost-Benefit Comparisons: CRAC2 Consequences D-31

LIST OF FIGURES

Figure Page

D-1 Illustration of the Impact of Preventive Options on Core-Damage Frequency D-8
D-2 Comparison of Safety Option Risk of Latent Cancer Fatalities: MACCS Calculation D-13
D-3 Comparison of Safety Option Risk of Latent Cancer Fatalities: CRAC2 Calculation D-13
D-4 Comparison of Safety Option Risk of Early Fatalities: MACCS Calculation D-14
D-5 Comparison of Safety Option Risk of Early Fatalities: CRAC2 Calculation D-14
D-6 Cost-Benefit Comparison for the Safety Options as Calculated by MACCS D-22
D-7 Cost-Benefit Comparison for the Safety Options as Calculated by CRAC2 .... D-23

403

Appendix D
ASSESSMENT OF RISK-REDUCTION MEASURES

As described in Section 3 of the main report, a major effort in SARRP was the assessment of the reduction in risk that could be achieved by various postulated plant modifications. The risk-reduction measures considered included a number that have been proposed in previous studies and several aimed at the specific features of Peach Bottom that appeared to contribute most to both the frequency of core damage and to risk. It must be noted, however, that many of the generic safety options proposed in other studies were eliminated from consideration without detailed evaluation because it was clear that the more expensive options could not be cost-effective with respect to the reductions in risk that could potentially be achieved. The risk-reduction measures considered include modifications to plant systems, the addition of new equipment, and changes to operating procedures and practices. The proposed options were developed in an attempt to address the risk associated with two types of consequence measures: the health and safety of the public and the potential for financial losses, both offsite and onsite. The list of options for specific consideration for Peach Bottom therefore included measures aimed at reducing the frequency of core damage (referred to in this report as preventive options) and at decreasing the consequences of core-damage events (called mitigative options). The benefits that could be realized by the implementation of each of these options were also compared to estimates of their costs and other potential negative impacts.

The following sections describe in more detail the evaluation of the risk-reduction options and the assessment of their impact on risk. The important information from this Appendix has already been included in Sections 3 and 6 of the main report. It should be noted that the information concerning the safety options presented here is not as detailed as for some of the other SARRP reference plants. As noted in the main report, there were some schedule limitations which resulted in reduced scope for some parts of the analysis. The final report for Peach Bottom will include some additional detail; for example, the containment response for the mitigation options will be more thoroughly presented.

D.1 SUMMARY OF SAFETY OPTIONS EVALUATED

The generic safety options (identified in Section 3) were considered in the context of the design and risk features for Peach Bottom, and were either specified in more detail or were eliminated from further consideration. Some of the generic options were not included in the

403

analysis for Peach Bottom because they would clearly have a limited potential to reduce risk or because they were not applicable to the Peach Bottom design.

In addition to considering the generic options, the Peach Bottom results were reviewed in an attempt to propose changes addressed to specific and unique aspects of the accident sequences. Frequently, such options offer the most promise of being cost-effective. The options considered for Peach Bottom are described in the following discussions.

D.1.1 Description of Accident-Prevention Options

The options intended to improve safety through the reduction of the frequency of core-damage sequences are described briefly below. These options were identified primarily by examining the sequence-level cut sets highest in frequency.

Option P1: Reduced Probability for Common-Cause Failure of Dc Power

The dominant contributors to the frequency of core-damage for Peach Bottom involve scenarios in which dc power is unavailable following a loss of offsite power due to common-cause failure of the batteries. In the ASEP assessment of Peach Bottom, it was determined that the testing and maintenance activities for the four trains of emergency batteries (trains A and B for Unit 2 and trains C and D for Unit 3) are subcontracted, and that administrative procedures do not preclude same-day testing or maintenance of multiple trains. Therefore, the potential for an error to be made on more than one train exists. The safety option that was evaluated involved the implementation of controls that would require that testing and maintenance activities be staggered. It was assumed that the train A and train D batteries would be subjected to routine testing together on a quarterly basis, with testing of train B the following month and train C the month after that. The discharge tests would all be done separately. These steps would tend to minimize the chances that an error could be duplicated on more than one train of batteries.

Option P2: Use of the Fifth Diesel Generator

The emergency ac power system at Peach Bottom is comprised of four diesel generators. However, a fifth, lower-capacity diesel generator exists at the site. Although it could not be used to recover all of the functions lost if one of the emergency diesel generators were to fail, it could be used to supply power to a control-rod drive (CRD) pump, which could provide injection to the reactor vessel. The safety option that was considered therefore involved extending current procedures and technical specifications to cover the use and maintenance of the fifth diesel generator as well. It is assumed that the administrative controls

BEST COPY AVAILABLE

would be structured in such a way as to minimize the potential for the fifth generator to be affected by failure causes common to the others. It would also be necessary to establish connections from the generator to the CRD pump.

Because of the relatively low flow capacity of the CRD pump, this option would not affect short-term station-blackout scenarios. It could, however, reduce the frequency of longer-term scenarios, in which eventual depletion of the station batteries would otherwise lead to loss of the ac-independent cooling systems. In order for this option to be effective in the long term, it would also be necessary to establish venting of the wetwell, providing a path for the rejection of decay heat in an open-cycle mode. This would entail changing the procedure for containment venting, and might require modification of the hardware associated with the venting in order to ensure its availability under the long-term blackout conditions of interest.

Option P3: Use of the Diesel-Driven Fire Pump for Injection

Peach Bottom has a diesel-driven pump for the fire-protection system which has a capacity of 2500 gpm with a shutoff head of 125 psi, and which could be used for injection of cooling water to the core. Current procedures call for its use under certain conditions, and blind flanges and hosing connections exist for injecting into the the low-pressure injection lines. However, the procedures do not address the accident scenarios for which this pump could be most beneficial, notably those involving station blackout. Option P3 therefore examined the effects of revising the procedures to provide explicit instructions to the operators regarding how to align the valving to use the fire pump for injection when ac and/or dc power is unavailable. As was the case for option P2, it would also be necessary to modify the procedures for venting and make any necessary changes to the venting hardware.

In addition to the long-term station-blackout sequences addressed by option P2, the fire pump could be used to maintain core cooling under short-term blackout conditions as well, by using the automatic depressurization system (ADS) to reduce reactor-vessel pressure to below the pump's shutoff head. To enable the ADS to be used for cases in which dc power is unavailable, either early or because of long-term battery depletion, it would also be necessary to modify the operators for the ADS valves. This could be accomplished by connecting a manually-controlled nitrogen supply to the actuators on the ADS SRVs.

Three other points should be noted with regard to the consideration of preventive options for Peach Bottom. First, although it was not explicitly considered as a part of any of the safety options, it would be advisable to provide at least some containment-pressure instrumentation with dc power; currently, it is understood that all such instrumentation requires ac power. For long-term station blackout sequences, having dc-powered instrumentation available could provide information that would improve the operators' ability to understand the situation and take appropriate measures in the six hours between the initiation of the accident and the depletion of the batteries.

Second, because the sequences involving depletion of the batteries are important, extending the capacity of the batteries was examined as an option. It was discarded, however, because it would not be particularly effective in reducing core-damage frequency. The limited effectiveness results from the potential for the RCIC and HPCI pumps to fail due to high turbine-exhaust pressure or high pressure suppression pool temperature, conditions that would occur shortly after the assessed time of battery depletion in the current analysis. Extending the life of the batteries would change the cause of failure of the injection pumps, but would not eliminate the sequence.

The third point concerns the emergency service-water system. At Peach Bottom, this system provides cooling to the four diesel generators. The pumps for this system receive power from diesel-generators 2 and 3 (from Units 2 and 3, respectively). The service-water system has a backup pump which is powered from diesel-generator 4 (for Unit 3). However, in the original ASEP analysis, it was assumed that the use of one of two booster pumps (powered by diesel-generators 2 and 3) would be required for success of the backup pump. Therefore, the loss of these two generators would still result in failure of all of the diesel-generator cooling, and consequently all of the generators would be lost. However, Peach Bottom personnel have tested the backup cooling-water pump and determined that it can function successfully without the support of the booster pumps. Therefore, the analysis was revised, and no safety option associated with modifying this configuration was assessed. However, it would still appear to be prudent to change the power supply for one of the booster pumps to diesel-generator 4 to provide added assurance of the availability of the backup pump.

D.1.2 Description of Mitigative Options

A number of safety options intended to reduce the likelihood of containment failure and/or the severity of releases resulting from core damage were identified.

Option M1: ADS without Dc Power

As noted for option P3, the ability to depressurize the reactor vessel without dc power is a potentially desirable option to consider. For option P3, such an ability was considered as part of a low-pressure core-cooling alternative for its potential to prevent core damage. Option

M1 considers the capability to depressurize without dc power for its potential to mitigate the severity of a core-damage accident.

The loss of dc power (either from battery failure or depletion) characterizes the majority of plant-damage states which contribute to the calculated risk for Peach Bottom. Because operation of the SRVs in relief mode requires dc power, core degradation and subsequent breach of the reactor vessel would occur at high pressure. Option M1 considers a direct connection between high-pressure nitrogen bottles and some of the SRV actuators. The connection would be made such that manual opening a valve in the connecting line would pressurize the actuators causing the SRV to open. It is assumed that this option would be accompanied by the development of procedures identifying the triggers for manual use of this capability.

Option M2: Drywell Curb, ADS Without Dc, and Improved Venting

Option M2 represents a combination of features aimed at various aspects of the accident progression. In addition to adding the capability to operate the ADS valves without dc power, as in option M1, a curb would be constructed around the inner circumference of the drywell wall. The intent of the curb is to prevent attack of the drywell shell by the core material as it is ejected from the reactor vessel. The SARRP containment loading expert reviewers indicated that the ejection of the core debris under high pressure could lead to melting of the drywell shell because a jet or (jets) of debris would be directed from the RPV pedestal toward the drywell shell. The proposed curb could not prevent this postulated containment failure mechanism, but could prevent drywell meltthrough in the event of a low-pressure release of core debris from the RPV. The modification of the ADS would address many of the sequences that might otherwise proceed at high pressure. This option also includes improving the capability to vent the wetwell. For station-blackout sequences, it is difficult to accomplish venting. This option would include modifying the power supplies to the valves needed (and changing the procedures) in order to enhance the ability to perform venting under blackout conditions.

Option M3: Drywell Curb

This option considers the separate impact of only installing the drywell curb, as described for option M2.

Option M4: Improved Drywell Sprays

The drywell spray system at Peach Bottom is dependent on the availability of ac power. Spray is provided by the RHR pumps which take suction from the suppression pool. Thus if either ac power is failed, or the suppression pool is saturated, the normal spray system is inoperable. Since the dominant core-damage sequences involve station blackout, the sprays are generally not available as a mitigative measure. Option M4 is intended to examine the effect of adding the capability for spray operation for station-blackout sequences. This could be accomplished either by the installation of an entirely separate spray train, or by utilizing the diesel-driven fire pump described for option P3.

Option M5: Improved Venting

Option M5 examines the effectiveness of the improved capability for venting of the wetwell, described for option M2, as a separate modification.

Option M6: Area-Wide Fire Sprays for the Reactor Building

After egress from the containment, the fission products released by melting of the core must generally still pass through the reactor building. In portions of the containment event analysis, the failure of the drywell or wetwell is sufficiently severe to cause extensive damage to the reactor building, limiting its ability to retain fission products. However, not all failures of containment are that severe. At Peach Bottom, the reactor building fire sprays are designed only to limit the spread of fire from one unit to another. The spray pattern is therefore only a localized curtain between units. This safety option examines the effect of increasing retention of the radionuclides in the reactor building by extending the fire sprays to cover the building more fully (it should be noted that the reactor buildings for some other BWRs, e.g., Browns Ferry, already have area-wide fire-suppression systems).

D.2 EVALUATION OF EFFECTS ON RISK MEASURES

The effectiveness of the proposed safety options in terms of reducing public health and financial risk was also performed. The risk reduction associated with each option is discussed in Section D.2.3. Prior to that the effect of the safety options on pieces of the risk equation are also provided: Section D.2.1 includes the insights concerning reduction in core-damage frequency, while Section D.2.2 provides an overview of the impact of the mitigation options on containment response.

D.2.1 Effect of Preventative Options on the Core-Damage Frequency

The overall impact of the accident-prevention options on the core-damage frequency is listed in Table D-1.

Table D-1
IMPACT OF ACCIDENT PREVENTION OPTIONS ON CORE-DAMAGE FREQUENCY

Measure of Core-Damage Frequency	Base Case	Option P1	P2	P3
LLH Highest Value	4.1×10^{-5}	2.4×10^{-5}	3.8×10^{-5}	2.0×10^{-5}
LLH 95th Value	3.8×10^{-5}	2.1×10^{-5}	3.7×10^{-5}	1.9×10^{-5}
LLH Mean	6.8×10^{-6}	4.7×10^{-6}	5.5×10^{-6}	3.3×10^{-6}
LLH Median	3.8×10^{-6}	2.9×10^{-6}	2.7×10^{-6}	1.6×10^{-6}
LLH 5th Value	1.3×10^{-6}	1.3×10^{-6}	5.5×10^{-7}	5.8×10^{-7}
LLH Lowest Value	8.2×10^{-7}	8.2×10^{-7}	5.2×10^{-7}	5.3×10^{-7}
Central Estimate	6.6×10^{-6}	4.5×10^{-6}	5.3×10^{-6}	3.3×10^{-6}

The effect of these options on the core-damage frequency is also illustrated in Figure D-1. The first option eliminated the sequence assessed as being dominant in the ASEP analysis, TBUX--a loss of all electrical power due to a loss of offsite ac power and onsite dc power (which precludes operation of the emergency diesel generators). The suggested modification is procedural only, thus offering a relatively low-cost method of addressing the dominant accident. It should be noted however, that there is substantial uncertainty in the methodology for assessing the probability of such a common-mode error and any conclusions concerning either the base case study or the proposed modification for this scenario must consider the uncertainty in the quantification process that concludes that one procedural method is better than another by a given amount. In any case, reduction in the frequency of this dominant sequence does not change the overall core damage frequency result too significantly, and the range of uncertainty is only reduced by about a factor of two at the high end.

Options P2 and P3 also addressed station-blackout scenarios. Option P2 provides another mechanism for injecting water into the core when all power is lost. However, because a single control rod drive pump has a relatively low flow rate, this option is only useful for long-term accidents in which the flow required to cool the core is reduced because of previous cooling and the reduction in decay heating. The impact of a frequency reduction for this one type of scenario is relatively insignificant in terms of overall results, as illustrated in Table D-1 and Figure D-1.

Option P3 addresses the power loss accidents by establishing procedures for the use of the diesel-driven fire pump in a station blackout accident, although the output would be limited in pressure (125 psi). Because the core-damage frequency was dominated by high pressure scenarios, this option was always coupled with a modification of the ADS such that it could operate in the absence of dc power. This allows the reduction of the vessel pressure to the point where the fire pump could have a successful impact. The implementation of this option would lead to approximately a factor of two reduction in the core-damage frequency profile.

As indicated by the results above, there are enough limitations associated with the options proposed that they do not apply to all of the important scenarios. Other options were initially considered, but most that could be effective on a large enough percentage of the accidents to result in substantial reduction in core-damage frequency would also be prohibitively expensive (they would involve new systems.) Because the core-damage frequency assessed in the ASEP study of Peach Bottom was fairly low (in comparison to the results of other PRAs), it was recognized that the addition of entirely new systems would not likely prove cost effective.

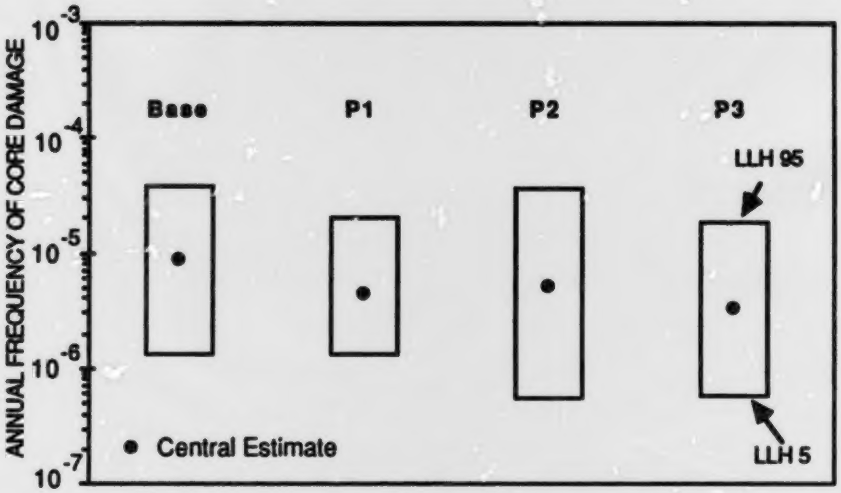

Figure D-1. Illustration of the Impact of Preventive Options on Core-Damage Frequency

D.2.2 Effect of Mitigative Options on the Containment Response

The actual impact of the mitigation options on containment response is only apparent through review of the detailed intermediate outputs of the calculation process. Time did not permit a thorough presentation of the intermediate results (e.g., containment event tree results for all options) required to view the mitigation effects in detail. [More detail concerning the

BEST COPY AVAILABLE

410

impact of the mitigation options on containment response will be provided in the final version of this report.] It is possible to qualitatively discuss the effect of the mitigation options, and the impact on the results can be examined through a review of the risk results, in particular, the contribution of the various accident-progression bins to risk. A brief discussion of these results as they apply to each mitigation issue follows.

The first mitigation option directly addresses the dominant station-blackout scenarios by providing a means to depressurize the reactor vessel. This option can have a mitigative effect by allowing RPV depressurization to the suppression pool either before or during core damage, thus reducing the severity of containment loadings associated with vessel breach. Ejection of the core debris would be less energetic than for a high-pressure core melt and early loading of the containment would also be less since there would be no ejection of hot gases under pressure. Direct heating of the containment and the possibility that debris ejected under pressure could melt the drywell shell if contact were made all increase the probability of containment failure induced by RPV meltthrough at high pressure, and the impact of this option is therefore to reduce that loading. This option is also part of the P3 safety option discussed above. The combination of P3 and this option better characterizes the maximum benefit to be derived from modifications of this type. The contribution of the important (greater than 5% contribution) accident-progression bins to risk is displayed in Tables D-2 and D-3. For option M1, the bins involving high pressure become insignificant to risk, as does any contribution of direct heating. Thus the option has the desired impact of lessening the risk associated with accidents progressing at high pressure. [Table B-19 in Appendix B includes the key to the bin nomenclature.]

The second mitigation option includes all of the first option and other features designed to prevent risk-significant phenomena. The option includes a drywell curb which is intended to reduce to probability of direct contact of molten core debris on the drywell. It is assumed that depressurization of the vessel will eliminate this containment failure mode. This option is combined with the first option because high-pressure ejection of core debris could negate the effects of a curb. Finally, if the probability of drywell meltthrough is reduced, containment venting becomes relatively more effective in reducing radionuclide releases. The final part of option 2 therefore improves the probability of successful venting by changing some valve power supplies and procedures to allow venting in station-blackout scenarios. As illustrated in the table, this option behave similarly to the first mitigation option in that the contribution of high-pressure scenarios becomes unimportant. In addition, the containment rupture failure modes become unimportant, as the vent changes those to late leakage categories.

411

Table D-2

COMPARISON OF BASE CASE AND MITIGATION OPTIONS: CONTRIBUTION OF ACCIDENT-PROGRESSION BINS TO EARLY FATALITY RISK (MACCS)

		Contribution to Early Fatalities[1]				
		Options				
Accident-Progression Bin	Base Case	M1	M2	M3	M5	M6
EBAACCFGFDBCBABBEGBBBB	–	–	6.7%	–	–	–
EBAACCGGDDBCBABBEGBBBB	–	7%	–	–	–	–
EBAACCGGDDBCBABBEHABBB	–	13%	–	–	–	–
EBAACCGGDDBCBABBEHBBBB	–	10%	–	–	–	–
EBAACCGGDDBCBADBEHABBB	–	5%	–	–	–	–
EBAACCGGDDBCBADBEHBBBB	–	34%	–	–	–	–
EBAACCGGEDBCBABBEGBBBB	–	–	20%	–	–	–
EBAACCGGEDBCBABBEHABBB	–	–	20%	–	–	–
EBAACCGGEDBCBABBEHBBBB	–	–	7%	–	–	–
EBAACCGGEDBCBADBEHBBBB	–	–	7%	–	–	–
EBACCCGBDDBCBABBHHABBB	–	–	–	–	9%	–
EBACCCGBDDBCBABAFBBABB	–	–	–	–	–	17%
EBACCCGBDDBCBABBHHBABB	–	–	–	–	8%	–
EBACCCGBDDBCBABBHHBBBB	–	–	–	–	17%	–
EBACCCGGDDBCBABBFBBABB	10%	–	–	12%	–	–
EBACCCGBDDBCBADAFABABB	–	–	–	–	–	7%
EBACCCGBDDBCBADAFBBABB	–	–	–	–	–	30%
EBACCCGGDDBCBABBFDABBB	4%	–	–	–	–	–
EBACCCGGDDBCBABBFEABBB	4%	–	–	–	–	–
EBACCCGGDDBCBABBFFABBB	4%	–	–	–	–	–
EBACCCGGDDBCBDDBHABABB	–	–	–	–	12%	–
EBACCCGGDDBCBADBFABABB	6%	–	–	6%	–	–
EBACCCGGDDBCBADBFBBABB	23%	–	–	27%	–	–

---

[1] Only the bins with contributions of approximately 5% or greater are presented here.

Table D-3

COMPARISON OF LLH BASE CASE AND MITIGATION OPTIONS: CONTRIBUTION OF ACCIDENT-PROGRESSION BINS FOR LATENT CANCER FATALITIES(MACCS)

		Contribution to Latent Cancer Fatalities[1]				
				Options		
Accident-Progression Bin	Base Case	M1	M2	M3	M5	M6
EBAAC[illegible]DBCBABBEHABBB	–		6%	–	–	–
EBAACCFGFDBCBABBEHABBB	–		5%	–	–	–
EBAACCFGFDBCBADBEHABBB	–		5%	–	–	–
EBAACCFGFDBCBADBEHBBBB	–		8%	–	–	–
EBAACCGGDDBCBABBEGBBBB	–	13%	–	–	–	–
EBAACCGGDDBCBABBEHABBB	–	14%	–	–	–	–
EBAACCGGDDBCBABBEHBBBB	–	23%	–	–	–	–
EBAACCGGDDBCBADBEHBBBB	–	12%	–	–	–	–
EBAACCGGEDBCBABBEGBBBB	–	–	11%	–	–	–
EBAACCGGEDBCBABBEHABBB	–	–	13%	–	–	–
EBAACCGGEDBCBABBEHBBBB	–	–	8%	–	–	–
EBAACCGGEDBCBADBEHBBBB	–	–	4%	–	–	–
EBACCCGBDDBCBABBHHABBB	–	–	–	–	10%	–
EBACCCGBDDBCBABBHHBABB	–	–	–	–	18%	–
EBACCCGBDDBCBABBHHBBBB	–	–	–	–	–	–
EBACCCGBFDBCCDDBHHABBB	–	–	–	–	5%	–
EBACCCGBFDBCCDDBHHBABB	–	–	–	–	10%	–
EBACCCGGDDBCBABAFABABB	–	–	–	–	–	6%
EBACCCGGDDBCBABAFBBABB	–	–	–	–	–	18%
EBACCCGGDDBCBADAFBBABB	–	–	–	–	–	12%
EBACCCGGDDBCBDDBHABABB	–	–	–	–	8%	–
EBACCCGGDDBCBDDBHHBABB	–	–	–	–	6%	–
EBACCCGGDDBCBABBFABABB	9%	–	–	10%	–	–
EBACCCGGDDBCBABBFBBABB	24%	–	–	26%	–	–
EBACCCGGDDBCBADBFBBABB	7%	–	–	7%	–	–

---

[1] Only the bins with contributions of approximately 5% or greater are presented here.

The third option provides for the drywell curb alone to measure the impact of just eliminating the drywell meltthrough failure mode. As illustrated in Table D-2, the types of accidents contributing to risk a nearly the same as the base case, primarily because one-half of the outcomes do not include drywell meltthrough and other phenomenon become important to the risk profile.

Option M5 considers the mitigation effects of venting alone. The impact of this can best be seen in the table because the types of containment failure contributing to risk changes, with the early releases becoming important.

Finally option M6 has a direct effect on the source term, and the impact on containment response is seen only through the bin parameter specific to this risk option (the 16th parameter accounts for global fire sprays. The impact of the sprays can only be seen in the risk results.

It should be noted that the understanding of the implementation of the safety options is difficult to derive from information in the table since it is based on the LLH mean, whereas the individual sample members at each end of the range determine the actual impact. The risk results in the next section illustrate the effects of the options more clearly.

D.2.3 Effects of Safety Options on Risk

The risk was recalculated for each of the safety options by modifying the appropriate portions of the analysis to reflect the reductions in core-damage frequency or changes in containment response. Prevention options were modeled by adjusting reliability data used in TEMAC or by incorporation of additional terms in the cut set expressions. Mitigation options were modeled by revising the containment event tree. The reduced risk of latent cancer and early fatalities for each option is illustrated in Figures D-2 through D-5. The figures illustrate the range of the LLH which was selected as the 5th to 95th percentiles of the sample member outcomes. Also shown are the effects of the safety options on risk, based on the central estimate calculation, although these were not available for all options.

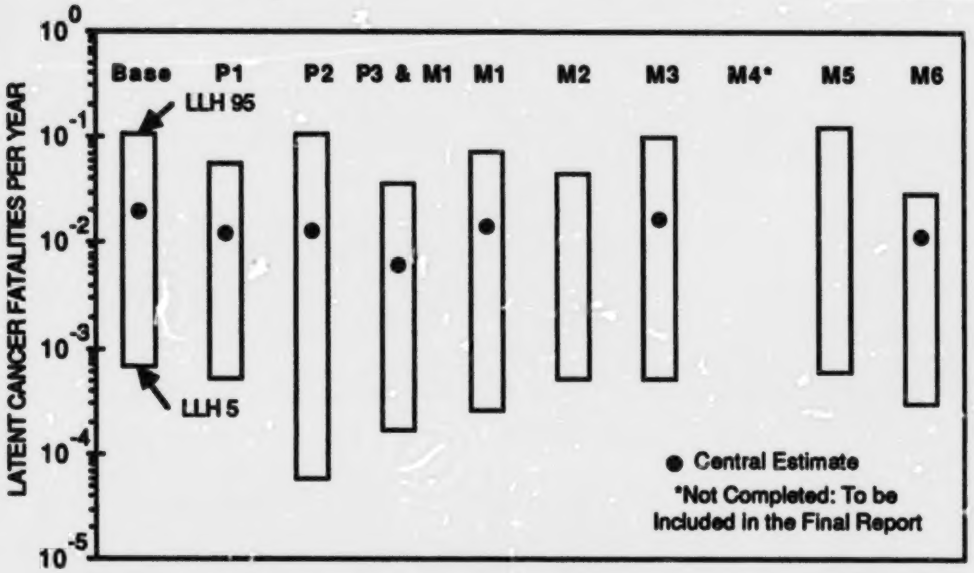

Figure D-2. Comparison of Safety Option Risk of Latent Cancer Fatalities: MACCS Calculation

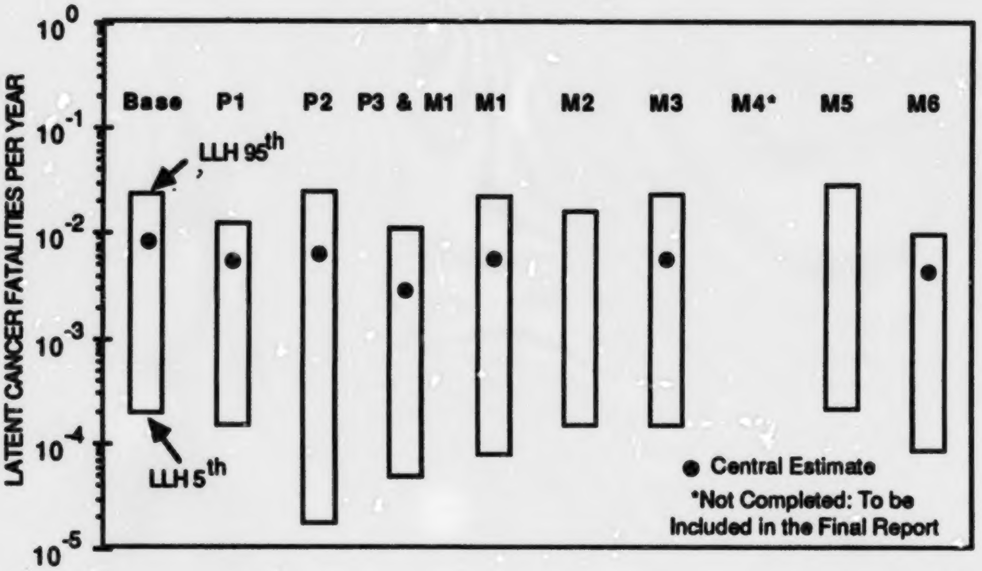

Figure D-3. Comparison of Safety Option Risk of Latent Cancer Fatalities: CRAC2 Calculation

415

BEST COPY AVAILABLE

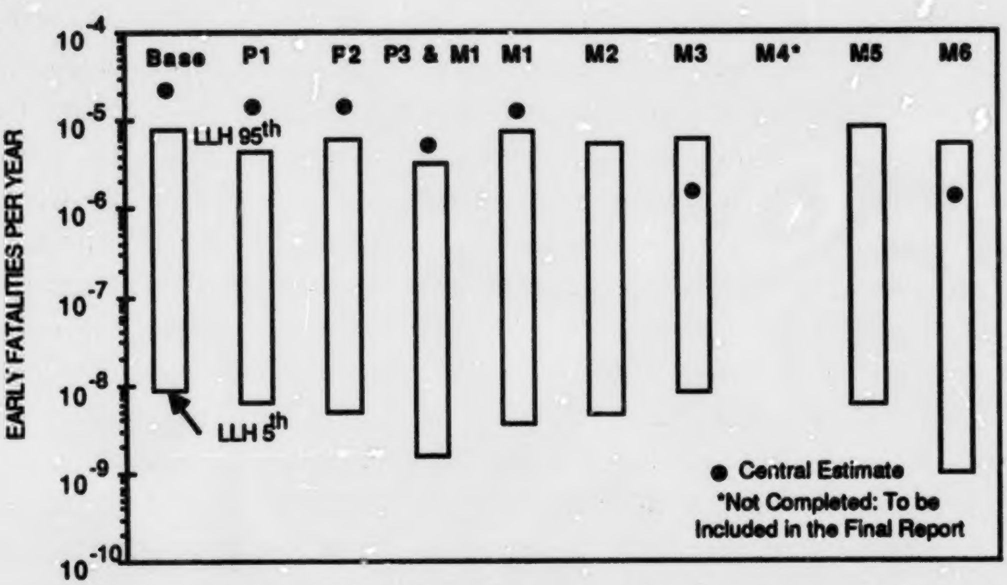

Figure D-4. Comparison of Safety Option Risk of Early Fatalities: MACCS Calculation

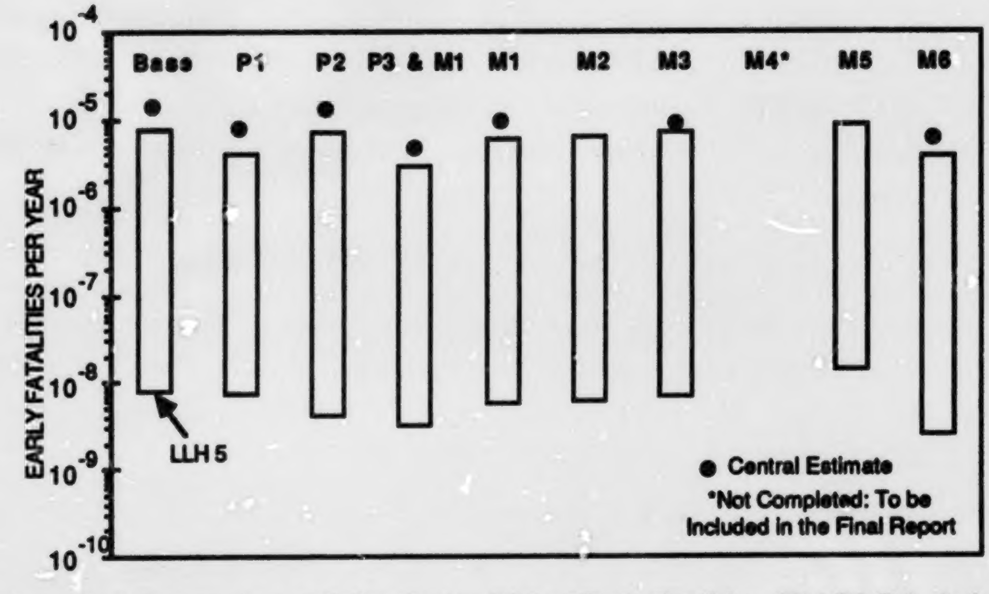

Figure D-5. Comparison of Safety Option Risk of Early Fatalities: CRAC2 Calculation

As stated in Section 5 of the main report, the risk results in this report are known to include inaccurate treatment of some phenomena; in particular, the effects of the drywell sprays in the RHR mode were underestimated and the containment response results for some of the ATWS scenarios were inaccurate. For the risk-reduction options, the former error could result in the overstatement of benefits for some of the proposed modifications, including the improved vent and the area-wide fire sprays, but the basic trends seen in the analysis here would be expected to hold. These errors will be corrected in the final version of this report. As shown in the figures, most options did not have a major effect on the risk measures. Option P3 combined with M1 does appear to result in a downward shift in risk for both risk measures, but the impact is not major. Option M6, the area-wide fire sprays in the reactor building, tends to have a noticeable impact also, primarily on the latent cancer risk measure. Option P1 also reduces the risk because of a reduction in core-damage frequency, but that effect is also quite limited (the top of the uncertainty is lowered by a factor of two). Overall, it can be generally concluded that the risk-reduction options selected for this study had limited impact, particularly when uncertainties and the limitations of the analysis are considered.

There is a potential that some of the mitigation options could increase risk. This facet of the results, which is not clearly seen in the displays in Figures 6-1 and 6-2, is explored further in the comparison of costs and benefits. While all of the options (except one) result in a reduction in risk for most of the sample members, all of the mitigation options have the show the potential to increase risk for the conditions associated with certain sample members. The implication of this is that before further consideration is given to these options, the uncertainty must be reduced such that there is high assurance that the proposed option does not, in fact, lead to risk increase.

D.3 ASSESSMENT OF IMPACT FOR RISK-REDUCTION MEASURES

The investigation of the merit of the proposed risk-reduction measures requires a thorough evaluation of impact that would result from their implementation. As discussed in Section 3 of the main report, there are three principal types of impact considered in the first-cut evaluation of each option:

1. The total cost associated with installation of the proposed modification.
2. The ongoing costs to the utility (maintenance, increased plant downtime, etc.) that arise from the modification.
3. The personnel dose associated with installation and maintenance of the option.

417

While there may be other types of impacts that are also significant, a value/impact assessment that is limited to consideration of the costs noted above serves as an effective screening evaluation. The costs and other impacts of any modifications that appear as a result of the screening analysis to be beneficial can be evaluated more thoroughly. Replacement power costs directly attributable to downtime associated with the implementation of the option would be one of the most significant concerns in a detailed examination of cost benefit. In addition, the actual design of each option would have to be specified.

The costs for the modifications considered for Peach Bottom are delineated in Section D.3.1, and estimated personnel doses associated with the options are included in Section D.3.2. All of these estimates are based on the impact information included in Appendix F. Although the cost of replacement power is not included in the basic cost estimates, Section D.3.3 includes a brief discussion of this potential impact. That discussion provides additional perspective for consideration of the risk-reduction measures and insights useful to a more complete assessment of replacement-power costs.

D.3.1 Estimated Costs of Risk-Reduction Measures

As stated above, the information compiled in Appendix F was used to estimate costs for each of the proposed risk-reduction measures. Table D-4 provides the installation cost for each option, including an estimate of the uncertainty (presented in terms of an upper and a lower estimate). The basis for each estimate is included in the notes that follow the tables. The recurring costs associated with increased maintenance and operation costs for the plant after installation of the option are presented in Table D-5. The present value of the total cost of each option, considering the year in which an accident could occur, are listed in Table D-6.

It should be noted that the estimation of costs did not involve detailed study, and it is recognized that there may be some misjudgments concerning the costs. However, the costs are only being used as a screening for potentially important risk-reduction concepts, not evaluation of specific design changes.

D.3.2 Estimated Personnel Doses Due to the Risk-Reduction Measures

The radiation exposure associated with the installation of a modification is strongly dependent on the layout and practices at a specific plant, the schedule for implementation, and other factors that could only be determined through detailed planning of a specific option. Since this type of information was unavailable, the estimates of personnel dose are largely judgmental, and are intended only to be representative. If a proposed modification appeared to

Table D-4

ESTIMATED ONE-TIME COST FOR RISK-REDUCTION MEASURES

	Option		Total Installation Cost		Notes
		Lower	Central	Upper	
P1	Dc common-mode reduction	$50,000	$160,000	$500,000	1
P2	Use of fifth diesel generator	$150,000	$480,000	$1,500,000	2
P3 & M1	Fire system use as injection source and dc independent ADS	$3,000,000	$4,700,000	$14,000,000	3
M1	Dc independent ADS	$3,000,000	$4,700,000	$14,000,000	3
M2	Drywell curb, dc independent ADS and improved venting capability	$8,100,000	$13,000,000	$35,000,000	4
M3	Drywell curb	$5,000,000	$8,000,000	$20,000,000	5
M4.	Improved drywell sprays	$150,000	$480,000	$5,000,000	6
M5	Improved venting capability	$100,000	$320,000	$1,000,000	7
M6	Reactor building global fire sprays	$2,500,000	$6,000,000	$15,000,000	8

Notes to Table D-4 (Reference to "records" refers to Appendix F):

1. The low end of the cost accounts for a straightforward procedural change, the central estimate includes further review and some incorporation in the training program while the high end of the cost range reflects the need for the procedural change plus a specific change to training programs. These values are based primarily on judgment and comparison to the costs listed in Appendix F.

2. The central estimate reflects the costs associated with upgrading the status of the existing diesel to a system with safety significance. The cost is three times the cost of the first option, to account for the change in technical specifications and procedures. The high cost includes the potential that some slight modifications, may be required. The low cost is an estimate of the minimum initial cost of making the diesel available for emergency situations. These values are based primarily on judgment and comparison to the costs listed in Appendix F, although no specific records address these changes like those here.

3. This option includes the costs of changing procedures, similar to the two other mitigation options, but the cost is dominated by the hardware costs of adding a dc-independent ADS. The central estimate hardware modification costs were estimated from the costs of installation of new PORVs in an operating plant, discussed on page A-81 of Reference 1. The high and low costs were a factor of 1.5 down and 3 up from the central values. There might be less expensive ways of providing additional redundancy (a new battery train) that could be considered for this option, this will be considered in the final report.

4. See the individual options for a discussion of costs. These individual costs were added together for M2.

5. There was very little data to support this estimation. The costs of Mark I torus improvements in Reference 2 were thought to provide some insight and were used to estimate the costs here. These costs are known to be highly uncertain, plant specific, and dependent on the specific design.

6. The low and central costs are part of option P2, and those costs were used. The high cost reflects a new system, estimated to cost as high as twice the costs identified in Record 39.

7. This option includes analysis and procedure changes (as in option P1) plus cabling which is estimated to have a cost similar to the procedure change. Costs are double those of option P1.

8. The costs of fire protection system upgrades in Reference 2 were used for this option. The range in Appendix A of Reference 2 is $2.2 M to $10M, with $6.6M as a central. The high cost was increased due to uncertainty in what specific changes might be required.

Table D-5
ESTIMATED CONTINUING COSTS FOR RISK-REDUCTION MEASURES

		Total Continuing Costs			
	Option	Lower	Central	Upper	Notes
P1	Dc common-mode reduction	$5,000	$7,000	$14,000	1
P2	Use of fifth diesel generator	$5,000	$14,000	$150,000	2
P3	Fire system use as injection source and & M1 dc independent ADS	$75,000	$107,000	$214,000	3
M1	Dc independent ADS	$5,000	$7,000	$14,000	4
M2	Drywell curb, dc independent ADS and improved venting capability	$10,000	$14,000	$28,000	5
M3	Drywell curb	$0.0	$0.0	$0.0	6
M4.	Improved drywell sprays	$5,000	$14,000	$300,000	7
M5	Improved venting capability	$5,000	$14,000	$300,000	8
M6	Reactor building global fire sprays	$140,000	$200,000	$400,000	9

Notes to Table D-5 (Reference to "records" refers to Appendix F):

1. Based on records 31 and 27, as well as the options considered in the analyses of the other SARRP plants.
2. The low cost would be similar to option P1. The central cost was doubled over P1 since there would be entirely new test procedures rather than modification of existing ones. The high cost was estimated to be 10 times the central as there could be an increase in maintenance and inventory that would be fairly costly.
3. This system would require more maintenance than associated with the change in Record 44, but probably less than record 55. The costs associated with option P1 were also added in to account for procedural changes
4. Based on a comparison to the costs associated with records 31 and 27.
5. Costs of the separate modifications were added together.
6. It was assumed that once in, the curb would require no maintenance or surveillance of any kind.
7. The low and central costs are for minimal changes such as procedural changes. The high value reflects the cost of maintenance for new hardware, lying somewhere between the maintenance costs of records 49 and 50. See also Sequoyah option P7.
8. This could be a very simple change, with minimal recurring cost, or the new connection could require testing as reflected in the high cost estimate.
9. It appears that an error was made in this entry, and diesel maintenance costs were used, whereas the recurring costs might be expected to be minimal for this option. This will be updated in the next draft.

BEST COPY AVAILABLE

Table D-6

ESTIMATED TOTAL COST OF RISK REDUCTION OPTIONS (PRESENT VALUE)

	Option	Total Cost (Present Value) Lower	 Central	 Upper
P1	Dc common-mode reduction	$140,000	$280,000	$740,000
P2	Use of fifth diesel generator	$240,000	$720,000	$4,000,000
P3	Fire system use as injection source and & M1 dc independent ADS	$4,300,000	$6,500,000	$17,600,000
M1	Dc independent ADS	$3,100,000	$4,800,000	$14,240,000
M2	Drywell curb, dc independent ADS and improved venting capability	$8,300,000	$13,000,000	$35,000,000
M3	Drywell curb	$5,000,000	$8,000,000	$20,000,000
M4.	Improved drywell sprays	$240,000	$720,000	$10,000,000
M5	Improved venting capability	$190,000	$560,000	$6,100,000
M6	Reactor building global fire sprays	$4,900,000	$9,400,000	$21,200,000

be beneficial, more detailed assessment of this factor would be required. The estimates of personnel dose used in the value/impact analysis are presented in Table D-7.

Table D-7

ESTIMATED DOSE FOR IMPLEMENTATION OF RISK-REDUCTION MEASURES

	Option	Installation Dose (Person-rem)	Annual Dose (Person-rem)	Notes
P1	Dc common-mode reduction	0.0	0.0	1
P2	Use of fifth diesel generator	0.0	0.0	1
P3 & M1	Fire system use as injection source and dc independent ADS	0.0	0.0	1
M1	Dc independent ADS	0.0	0.0	1
M2	Drywell curb, dc independent ADS and improved venting capability	640	0.0	2
M3	Drywell curb	640	0.0	2
M4.	Improved drywell sprays	0.0	0.0	1
M5	Improved venting capability	0.0	0.0	1
M6	Reactor building global fire sprays	0.0	0.0	1

Notes to Table D-7 (Reference to "records" refers to Appendix F):

1. It is unlikely that any significant additional exposure would result from this change.
2. The drywell curb would involve significant work in the drywell which would likely lead to some exposure. The values were estimated based on a review of the data provided in Table F-1 in Appendix F.

D.3.3 Insights Concerning Replacement Power

Although replacement power costs are not included for reasons cited in Appendix F, Table D-8 presents insights concerning this issue in order to more fully assess the impact of the proposed options. All of the proposed modifications could involve downtime due to the difficulties in scheduling a major modification during a normal shutdown period. This would be a very specific consideration which could not be judged with the amount of detail considered in this study. The table only includes entries for those items that could be expected to have significant downtime in addition to that which could result from problems in scheduling a major modification activity. Costs for downtime also vary widely, but $500,000/day is a fairly representative value.

D.4 COSTS VERSUS BENEFITS

In order to provide a direct comparison for the averted risk and the costs associated with each of the modifications, it was necessary to develop a measure of benefit in terms of a dollar value. Because a number of different approaches to the characterization of the benefits associated with reduced risk have been used in the past, the benefits for the safety options were calculated in four ways:

(1) Averted offsite costs, consisting of the differences in costs of property damage (as calculated by MACCS or CRAC2) plus an assigned value for reduction in health effects ($1 million for each averted early fatality and $100 thousand per averted latent-cancer fatality and early injury);

(2) Averted offsite costs calculated as $1000 per person-rem averted within 50 miles of the plant;

(3) Averted offsite costs, as in (1), plus averted onsite costs (calculated as described in Section 3); and

(4) Averted offsite costs at $1000 per person-rem plus averted onsite costs.

These measures of benefits, as calculated from the ranges of LLH outcomes, are presented in Figures D-6 (for MACCS) and D-7 (for CRAC2). The range of costs for each option is also shown to provide a comparison between the costs and benefits. In developing the ranges for the measures of averted risk, the estimate for each LLH sample member for an option was subtracted from the estimate for the same sample members in the base case. The differences were then re-ordered, and the 5th and 95th percentiles of the 150 sample members serve as the ranges depicted in the figures. It is possible, and in fact the case, that for some sample members the options implied an increase in risk rather than a decrease.

432

Table D-8

ESTIMATED REPLACEMENT POWER TIMES FOR RISK-REDUCTION OPTIONS

Option		Possible Downtime (Days)	Comments
P1	Dc common-mode reduction	0	It is unlikely that additional downtime would be required.
P2	Use of fifth diesel generator	0	It is unlikely that additional downtime would be required.
P & M1	Fire system use as injection source and dc-independent ADS	2 - 10	The connection of the nitrogen bottles for the independent ADS might require access that could affect scheduling
M1	Dc-independent ADS	0 -3	As described above, the connection of the nitrogen system could affect the expected schedule of an outage.
M2	Drywell curb, dc independent ADS and improved venting capability	10 - 100	The drywell curb is a very large unknown in terms of the potential schedule problems. The design is not detailed enough to determine the extent of the potential impact. It is very likely that this option would require more time than could be fit into a normal refueling schedule.
M3	Addition of a drywell curb	10 - 100	As stated above, the drywell curb would likely involve downtime for modification, but it is not possible to estimate accurately since it is a conceptual modification.
M4	Improved drywell sprays	0 - 15	Most likely this would involve procedural changes rather than hardware additions, but if a new train of sprays was required, there could be some downtime associated with the work.
M5	Improved venting capability	0 - 1	The venting changes might have some schedule impact due to the need to change power supplies, but it could likely be accomplished within a planned outage.
M6	Reactor building global fire sprays	0 - 5	It is unlikely that this would require downtime, although the possibility exists that scheduling conflicts or problems with interconnections could force some downtime.

423

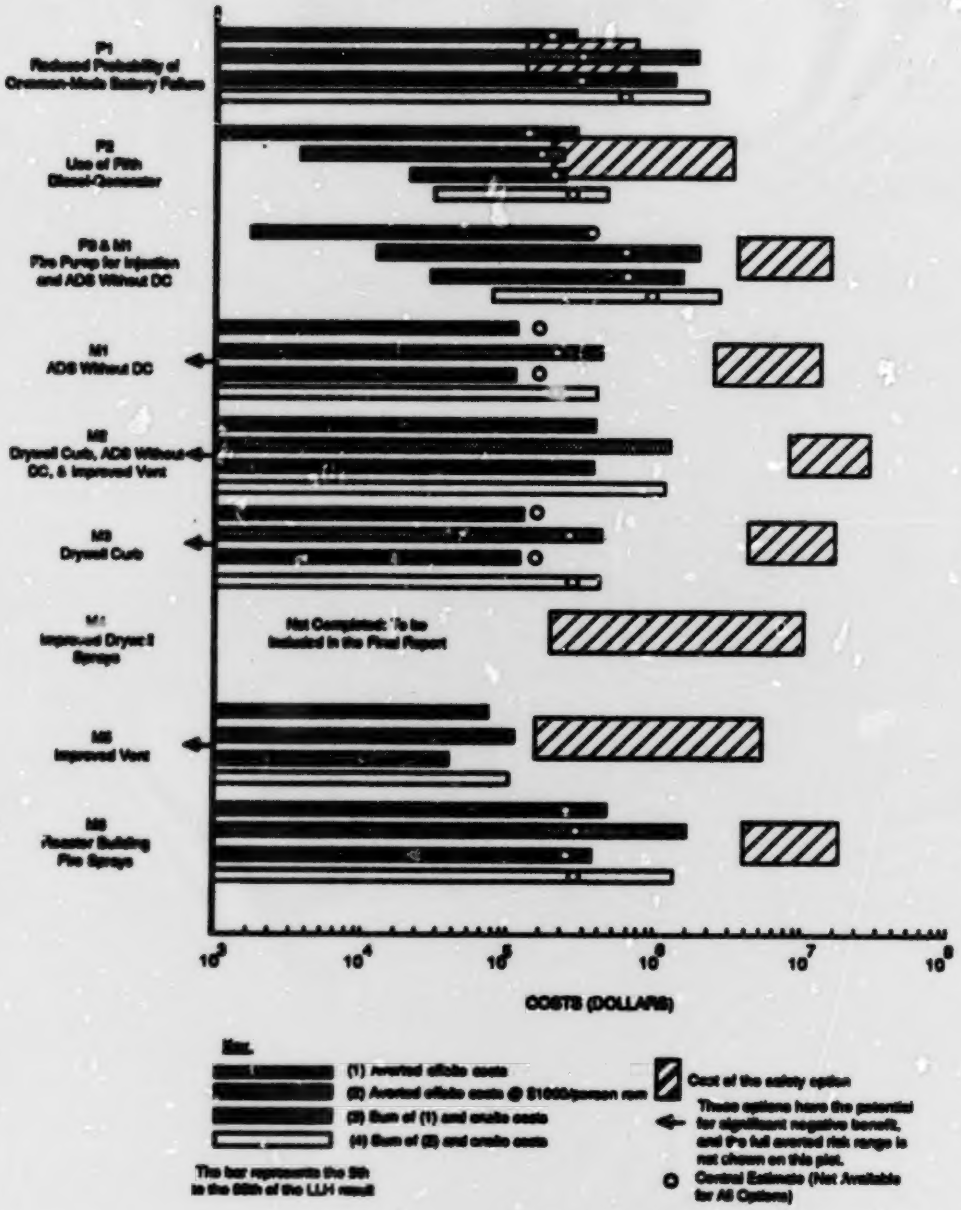

Figure D-6. Cost Benefit Comparison for the Safety Options as Calculated by MACCS

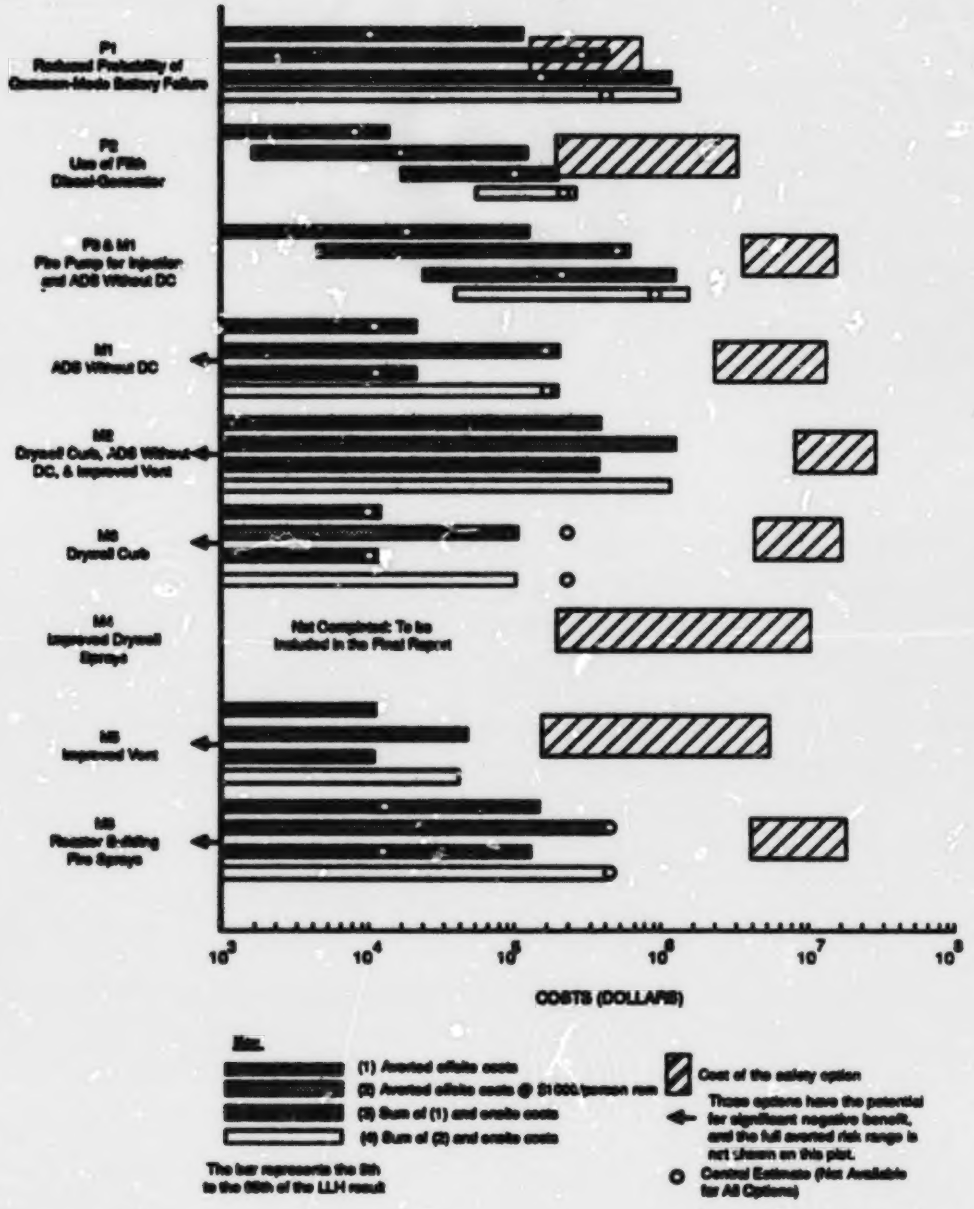

Figure D-7. Cost Benefit Comparison for the Safety Options as Calculated by CRAC2

The options that would be most cost-effective are generally those that indicate the largest overlap between the costs and the averted risk. As indicated in Figures D-6 and 7, the options most likely to be cost-effective are those that could potentially be accomplished through changes to procedures or administrative controls. The option that shows the greatest degree of overlap was option P2A, the revision of emergency procedures for optimized use of the fire system as a source of core injection. Although this was evaluated to be very inexpensive, the option is still not beneficial from a cost/benefit standpoint for all of the LLH range, although when onsite costs are included the option is beneficial for most of the LLH sample members. Option 2B accomplishes the same purpose, but more reliably and on a shorter time scale. The increased cost however results in a cost/benefit comparison that is only favorable for when onsite costs are added in. It should be noted that all of the options with an impact on the core-damage frequency do exhibit some overlap when onsite costs are included. This results from the fact that the Peach Bottom plant is new and the substantial cost of plant and power replacement over the remaining life of the facility dominates the onsite cost calculation and results in the potential for relatively high costs for any accident. The central estimates for the prevention options indicate a favorable cost-benefit comparison, but only when the onsite costs are included.

On the other hand, as indicated in the figures, none of the mitigative options was evaluated to be cost-effective. The combination of option M2 and P1 is seen to be marginally cost effective. However a comparison of these results with those for the P1 option alone reveals that the added cost of M2 to provide mitigation benefit is not justified on the basis of these results. The central estimate results generally mirror the LLH results. These options all involved relatively extensive (and consequently expensive) modifications to existing plant systems or structures. The risk for Peach Bottom was sufficiently low such that modifications of this nature would not generally be justified on a cost-benefit basis. In addition, all of the mitigation options were evaluated to have a significant potential to increase the risk of individual sample members, resulting in the general conclusion that these options, as defined in this study, do not appear beneficial.

As noted, some of the mitigation options showed some negative benefit for some sample members (the area-wide fire sprays only showed very slight negative benefit and only for the CRAC2 result). The uncertainty in the containment response is large enough that conclusions regarding the impact of the options are difficult to establish. Some of the options have as big a potential for negative benefit (increased risk) as they do positive. The reasons for the negative outcomes in this display are not always immediately obvious. Investigation of the

426

physical reasons giving rise to these results is time consuming since it involves the examination of the individual sample members, and this investigation has not been completed for Peach Bottom at the time of this report. The analysts do have some hypotheses as to phenomena resulting in increased risk. For options that include provisions to actuate containment venting in the event of a loss of ac power, there are several factors which can lead to negative benefit:

- The venting path, which is initiated from the wetwell airspace, is assumed to bypass the reactor building. Hence, the potential benefit of deposition in the reactor building is not realized. In some of the LLH sample members, the reactor building decontamination factor is larger than the suppression pool DF. Therefore the releases to the environment would have been lower if venting had not been initiated.
- Many of the accident progressions involving containment venting also involve recovery of ac power at some later time. In some of these cases, recovery of power would have enabled resumption of containment heat removal possibly averting containment failure. For this type of scenario, containment venting could lead to release of radionuclides that would have otherwise been retained in containment.
- Containment venting allows some releases to occur earlier in time than might have been the case if venting had not occurred. This has an impact on the warning time for emergency response, the potential for radionuclide decay and the effectiveness of natural deposition processes.
- Certain containment failure modes are not appreciably affected by venting and can occur whether venting is successful or not. These include meltthrough of the drywell shell, overpressurization due to rapid pressurization in the drywell (e.g., due to direct heating), and drywell failure due to high temperatures.

The possible negative benefits of an ac-independent containment vent for station-blackout accidents should not be construed as negating the benefits of the current venting procedures. The current procedures are principally responsible for lowering the probability of core damage from accident sequences involving loss of long-term heat removal (e.g. the TW sequence).

For the interested reader, Tables D-9 and D-10 list the results for the LLH, as calculated with MACCS and CRAC2, respectively. These tables include the detailed breakdown of option costs and averted costs.

427

Table D-9

DETAILED LLH COST-BENEFIT COMPARISONS: MACCS CONSEQUENCES

SAFETY OPTION :P1--IMPROVE D.C. COMMON MODE
VALUE-IMPACT ANALYSIS

	5TH	MEDIAN	95TH
CHANGE IN CORE MELT FREQUENCY	8.947E-11	7.991E-08	1.788E-05
COSTS:			
INSTALLATION & ENG. COSTS	5.000E+04	1.600E+05	5.000E+05
OPERATING & MAINT. COSTS	8.581E+04	1.201E+05	2.403E+05
REPLACEMENT POWER DURING INST.	0.000E+00	0.000E+00	0.000E+00
REPLACEMENT POWER IN OPERATION	0.000E+00	0.000E+00	0.000E+00
TOTAL COSTS	1.358E+05	2.801E+05	7.403E+05
BENEFITS			
AVERTED ON-SITE COST	6.732E+00	5.929E+03	1.345E+06
AVERTED OFFSITE COSTS			
AVERTED PROPERTY DAMAGE	0.000E+00	1.547E+03	2.448E+05
VALUE OF AVERTED PROMPT FATALITY	0.000E+00	1.238E-01	4.306E+01
VALUE OF AVERTED EARLY ILLNESS	0.000E+00	1.440E-01	6.444E+01
VALUE OF AVERTED LAT. CANCER	0.000E+00	2.273E+02	8.799E+04
TOTAL AVERTED OFFSITE COSTS	0.000E+00	1.879E+03	3.355E+05
OFFSITE COSTS AT $1000/P-REM	0.000E+00	7.084E+03	2.305E+06
TOTAL AVERTED ON & OFFSITE COSTS			
(BASED ON COMPUTED COSTS)	6.732E+00	6.250E+04	1.430E+06
(BASED ON $1000/P-REM)	6.732E+00	8.158E+04	2.814E+06

SAFETY OPTION :P2--CRD IN SBO
VALUE-IMPACT ANALYSIS

	5TH	MEDIAN	95TH
CHANGE IN CORE MELT FREQUENCY	2.699E-07	1.067E-06	3.283E-06
COSTS:			
INSTALLATION & ENG. COSTS	1.500E+05	4.800E+05	1.500E+06
OPERATING & MAINT. COSTS	8.581E+04	2.403E+05	2.574E+06
REPLACEMENT POWER DURING INST.	0.000E+00	0.000E+00	0.000E+00
REPLACEMENT POWER IN OPERATION	0.000E+00	0.000E+00	0.000E+00
TOTAL COSTS	2.358E+05	7.203E+05	4.074E+06
BENEFIT			
AVERTED ON-SITE COST	2.031E+04	7.903E+04	2.470E+05
AVERTED OFFSITE COSTS			
AVERTED PROPERTY DAMAGE	4.395E+02	9.388E+03	1.261E+05
VALUE OF AVERTED PROMPT FATALITY	3.592E-03	8.558E-01	2.911E+01
VALUE OF AVERTED EARLY ILLNESS	1.214E-02	8.432E-01	5.582E+01
VALUE OF AVERTED LAT. CANCER	1.404E+02	2.633E+03	1.141E+04
TOTAL AVERTED OFFSITE COSTS	5.351E+02	1.217E+04	1.376E+05
OFFSITE COSTS AT $1000/P-REM	4.480E+03	7.523E+04	3.005E+05
TOTAL AVERTED ON & OFFSITE COSTS			
(BASED ON COMPUTED COSTS)	2.244E+04	1.083E+05	3.036E+05
(BASED ON $1000/P-REM)	3.751E+04	1.592E+05	5.417E+05

Table D-9 (Continued)

DETAILED LLH COST-BENEFIT COMPARISONS: MACCS CONSEQUENCES

SAFETY OPTION :P3&M1--FIRE PUMP IN SBO & ADS W/O D.C.
VALUE-IMPACT ANALYSIS

	5TH	MEDIAN	95TH
CHANGE IN CORE MELT FREQUENCY	2.930E-07	1.968E-06	2.005E-05
COSTS:			
INSTALLATION & ENG. COSTS	3.000E+06	4.700E+06	1.400E+07
OPERATING & MAINT. COSTS	1.287E+06	1.836E+06	3.673E+06
REPLACEMENT POWER DURING INST.	0.000E+00	0.000E+00	0.000E+00
REPLACEMENT POWER IN OPERATION	0.000E+00	0.000E+00	0.000E+00
TOTAL COSTS	4.287E+06	6.536E+06	1.767E+07
BENEFITS			
AVERTED ON-SITE COST	3.093E+04	1.455E+05	1.508E+06
AVERTED OFFSITE COSTS			
AVERTED PROPERTY DAMAGE	1.472E+03	2.201E+04	4.016E+05
VALUE OF AVERTED PROMPT FATALITY	-3.193E-02	1.821E+00	7.367E+01
VALUE OF AVERTED EARLY ILLNESS	3.120E-02	1.890E+00	1.149E+02
VALUE OF AVERTED LAT. CANCER	4.398E+02	5.562E+03	9.398E+04
TOTAL AVERTED OFFSITE COSTS	2.054E+03	2.890E+04	4.352E+05
OFFSITE COSTS AT $1000/P-REM	1.342E+04	1.906E+05	2.378E+06
TOTAL AVERTED ON & OFFSITE COSTS			
(BASED ON COMPUTED COSTS)	3.637E+04	2.087E+05	1.695E+06
(BASED ON $1000/P-REM)	7.973E+04	3.340E+05	3.438E+06

SAFETY OPTION :M1--ADS W/O D.C. MITIGATION OPTION
VALUE-IMPACT ANALYSIS

	5TH	MEDIAN	95TH
CHANGE IN CORE MELT FREQUENCY	0.000E+00	0.000E+00	0.000E+00
COSTS:			
INSTALLATION & ENG. COSTS	3.000E+06	4.700E+06	1.400E+07
OPERATING & MAINT. COSTS	8.581E+04	1.201E+05	2.403E+05
REPLACEMENT POWER DURING INST.	0.000E+00	0.000E+00	0.000E+00
REPLACEMENT POWER IN OPERATION	0.000E+00	0.000E+00	0.000E+00
TOTAL COSTS	3.086E+06	4.820E+06	1.424E+07
BENEFITS			
AVERTED ON-SITE COST	0.000E+00	0.000E+00	0.000E+00
AVERTED OFFSITE COSTS			
AVERTED PROPERTY DAMAGE	-5.713E+02	5.804E+03	1.120E+05
VALUE OF AVERTED PROMPT FATALITY	-2.766E+00	5.124E-01	9.094E+00
VALUE OF AVERTED EARLY ILLNESS	-1.025E+00	4.857E-01	2.209E+01
VALUE OF AVERTED LAT. CANCER	-1.422E+02	1.396E+03	1.861E+04
TOTAL AVERTED OFFSITE COSTS	-4.568E+02	7.393E+03	1.202E+05
OFFSITE COSTS AT $1000/P-REM	-1.878E+04	4.525E+04	5.057E+05
TOTAL AVERTED ON & OFFSITE COSTS			
(BASED ON COMPUTED COSTS)	-5.709E+02	7.328E+03	1.186E+05
(BASED ON $1000/P-REM)	-2.124E+04	4.380E+04	4.820E+05

BEST COPY AVAILABLE

Table D-9 (Continued)

DETAILED LLH COST-BENEFIT COMPARISONS: MACCS CONSEQUENCES

SAFETY OPTION :M2--CURB, ADS, & VENT MITIGATION OPTIONS
VALUE-IMPACT ANALYSIS

	5TH	MEDIAN	95TH
CHANGE IN CORE MELT FREQUENCY	0.000E+00	0.000E+00	0.000E+00
COSTS:			
INSTALLATION & ENG. COSTS	8.100E+06	1.300E+07	3.500E+07
OPERATING & MAINT. COSTS	1.716E+05	2.403E+05	4.806E+05
REPLACEMENT POWER DURING INST.	0.000E+00	0.000E+00	0.000E+00
REPLACEMENT POWER IN OPERATION	0.000E+00	0.000E+00	0.000E+00
TOTAL COSTS	8.272E+06	1.324E+07	3.548E+07
BENEFITS			
AVERTED ON-SITE COST	0.000E+00	0.000E+00	0.000E+00
AVERTED OFFSITE COSTS			
AVERTED PROPERTY DAMAGE	-1.325E+05	5.634E+03	3.691E+05
VALUE OF AVERTED PROMPT FATALITY	-5.203E+01	5.853E-02	8.773E+01
VALUE OF AVERTED EARLY ILLNESS	-2.117E+01	4.849E-01	1.703E+02
VALUE OF AVERTED LAT. CANCER	-3.010E+04	1.346E+03	5.309E+04
TOTAL AVERTED OFFSITE COSTS	-1.687E+05	9.570E+03	4.524E+05
OFFSITE COSTS AT $1000/P-REM	-7.281E+05	1.455E+04	1.259E+06
TOTAL AVERTED ON & OFFSITE COSTS			
(BASED ON COMPUTED COSTS)	-1.696E+05	9.098E+03	4.461E+05
(BASED ON $1000/P-REM)	-7.441E+05	1.440E+04	1.203E+06

SAFETY OPTION :M3--CURB MITIGATION OPTION
VALUE-IMPACT ANALYSIS

	5TH	MEDIAN	95TH
CHANGE IN CORE MELT FREQUENCY	0.000E+00	0.000E+00	0.000E+00
COSTS:			
INSTALLATION & ENG. COSTS	5.000E+06	8.000E+06	2.000E+07
OPERATING & MAINT. COSTS	0.000E+00	0.000E+00	0.000E+00
REPLACEMENT POWER DURING INST.	0.000E+00	0.000E+00	0.000E+00
REPLACEMENT POWER IN OPERATION	0.000E+00	0.000E+00	0.000E+00
TOTAL COSTS	5.000E+06	8.000E+06	2.000E+07
BENEFITS			
AVERTED ON-SITE COST	0.000E+00	0.000E+00	0.000E+00
AVERTED OFFSITE COSTS			
AVERTED PROPERTY DAMAGE	-1.091E+02	2.698E+03	1.124E+05
VALUE OF AVERTED PROMPT FATALITY	-2.018E-01	2.103E-01	2.340E+01
VALUE OF AVERTED EARLY ILLNESS	-6.626E-02	2.580E-01	4.154E+01
VALUE OF AVERTED LAT. CANCER	-6.122E+01	7.272E+02	2.050E+04
TOTAL AVERTED OFFSITE COSTS	-1.775E+02	3.821E+03	1.335E+05
OFFSITE COSTS AT $1000/P-REM	-5.004E+02	2.511E+04	5.060E+05
TOTAL AVERTED ON & OFFSITE COSTS			
(BASED ON COMPUTED COSTS)	-2.123E+02	3.803E+03	1.257E+05
(BASED ON $1000/P-REM)	-5.581E+02	2.343E+04	5.009E+05

Table D-9 (Continued)

DETAILED LLH COST-BENEFIT COMPARISONS: MACCS CONSEQUENCES

SAFETY OPTION :M4--DRYWELL SPRAYS MITIGATION OPTION
VALUE-IMPACT ANALYSIS

	5TH	MEDIAN	95TH
CHANGE IN CORE MELT FREQUENCY	0.000E+00	0.000E+00	0.000E+00
COSTS:			
INSTALLATION & ENG. COSTS	1.500E+05	4.800E+05	5.000E+06
OPERATING & MAINT. COSTS	8.581E+04	2.403E+05	5.149E+06
REPLACEMENT POWER DURING INST.	0.000E+00	0.000E+00	0.000E+00
REPLACEMENT POWER IN OPERATION	0.000E+00	0.000E+00	0.000E+00
TOTAL COSTS	2.358E+05	7.203E+05	1.015E+07
BENEFITS			
AVERTED ON-SITE COST	0.000E+00	0.000E+00	0.000E+00
AVERTED OFFSITE COSTS			
AVERTED PROPERTY DAMAGE	-2.453E+04	1.512E+03	2.167E+04
VALUE OF AVERTED PROMPT FATALITY	-1.163E+00	3.950E-01	6.673E+00
VALUE OF AVERTED EARLY ILLNESS	-1.444E+00	2.010E-01	3.509E+00
VALUE OF AVERTED LAT. CANCER	-4.678E+03	4.224E+02	4.552E+03
TOTAL AVERTED OFFSITE COSTS	-2.774E+04	1.978E+03	2.770E+04
OFFSITE COSTS AT $1000/P-REM	-1.163E+05	1.616E+04	1.808E+05
TOTAL AVERTED ON & OFFSITE COSTS			
(BASED ON COMPUTED COSTS)	-3.216E+04	1.947E+03	2.652E+04
(BASED ON $1000/P-REM)	-1.491E+05	1.588E+04	1.478E+05

SAFETY OPTION :M5--VENT MITIGATION OPTION
VALUE-IMPACT ANALYSIS

	5TH	MEDIAN	95TH
CHANGE IN CORE MELT FREQUENCY	0.000E+00	0.000E+00	0.000E+00
COSTS:			
INSTALLATION & ENG. COSTS	1.000E+05	3.200E+05	1.000E+06
OPERATING & MAINT. COSTS	8.581E+04	2.403E+05	5.149E+06
REPLACEMENT POWER DURING INST.	0.000E+00	0.000E+00	0.000E+00
REPLACEMENT POWER IN OPERATION	0.000E+00	0.000E+00	0.000E+00
TOTAL COSTS	1.858E+05	5.603E+05	6.149E+06
BENEFITS			
AVERTED ON-SITE COST	0.000E+00	0.000E+00	0.000E+00
AVERTED OFFSITE COSTS			
AVERTED PROPERTY DAMAGE	-1.335E+05	-1.760E+03	4.352E+04
VALUE OF AVERTED PROMPT FATALITY	-2.587E+01	-4.542E-01	7.579E+00
VALUE OF AVERTED EARLY ILLNESS	-3.141E+01	-2.004E-01	1.336E+01
VALUE OF AVERTED LAT. CANCER	-3.001E+04	-5.378E+02	6.153E+03
TOTAL AVERTED OFFSITE COSTS	-1.728E+05	-2.248E+03	7.460E+04
OFFSITE COSTS AT $1000/P-REM	-6.459E+05	-2.490E+04	1.152E+05
TOTAL AVERTED ON & OFFSITE COSTS			
(BASED ON COMPUTED COSTS)	-1.752E+05	-2.328E+03	4.792E+04
(BASED ON $1000/P-REM)	-6.955E+05	-2.522E+04	1.015E+05

431

Table D-9 (Continued)

DETAILED LLH COST-BENEFIT COMPARISONS: MACCS CONSEQUENCES

SAFETY OPTION :M6--GLOBAL FIRE SPRAYS MITIGATION OPTION
VALUEVALUE-IMPACT ANALYSIS

	5TH	MEDIAN	95TH
CHANGE IN CORE MELT FREQUENCY	0.000E+00	0.000E+00	0.000E+00
COSTS:			
INSTALLATION & ENG. COSTS	2.500E+06	6.000E+06	1.500E+07
OPERATING & MAINT. COSTS	2.403E+06	3.433E+06	6.865E+06
REPLACEMENT POWER DURING INST.	0.000E+00	0.000E+00	0.000E+00
REPLACEMENT POWER IN OPERATION	0.000E+00	0.000E+00	0.000E+00
TOTAL COSTS	4.903E+06	9.433E+06	2.187E+07
BENEFITS			
AVERTED ON-SITE COST	0.000E+00	0.000E+00	0.000E+00
AVERTED OFFSITE COSTS			
AVERTED PROPERTY DAMAGE	-1.907E-06	5.093E+03	3.866E+05
VALUE OF AVERTED PROMPT FATALITY	-1.015E+00	4.029E-01	3.783E+01
VALUE OF AVERTED EARLY ILLNESS	-6.051E-03	5.694E-01	6.551E+01
VALUE OF AVERTED LAT. CANCER	-8.408E-01	1.669E+03	8.087E+04
TOTAL AVERTED OFFSITE COSTS	0.000E+00	6.982E+03	5.405E+05
OFFSITE COSTS AT $1000/P-REM	2.425E+02	6.534E+04	1.996E+06
TOTAL AVERTED ON & OFFSITE COSTS			
(BASED ON COMPUTED COSTS)	0.000E+00	6.703E+03	4.564E+05
(BASED ON $1000/P-REM)	2.299E+02	6.416E+04	1.534E+06

Table D-10

DETAILED LLH COST-BENEFIT COMPARISONS: CRAC2 CONSEQUENCES

SAFETY OPTION :P1--IMPROVE D.C. COMMON MODE
VALUE-IMPACT ANALYSIS

	5TH	MEDIAN	95TH
CHANGE IN CORE MELT FREQUENCY	8.947E-11	7.991E-08	1.788E-05
COSTS:			
INSTALLATION & ENG. COSTS	5.000E+04	1.600E+05	5.000E+05
OPERATING & MAINT. COSTS	8.581E+04	1.201E+05	2.403E+05
REPLACEMENT POWER DURING INST.	0.000E+00	0.000E+00	0.000E+00
REPLACEMENT POWER IN OPERATION	0.000E+00	0.000E+00	0.000E+00
TOTAL COSTS	1.358E+05	2.801E+05	7.403E+05
BENEFITS			
AVERTED ON-SITE COST	6.732E+00	5.929E+03	1.345E+
AVERTED OFFSITE COSTS			
AVERTED PROPERTY DAMAGE	0.000E+00	1.298E+02	8.968E+04
VALUE OF AVERTED PROMPT FATALITY	0.000E+00	9.387E-02	5.994E+01
VALUE OF AVERTED EARLY ILLNESS	0.000E+00	3.290E-01	4.412E+02
VALUE OF AVERTED LAT. CANCER	0.000E+00	6.847E+01	1.969E+04
TOTAL AVERTED OFFSITE COSTS	0.000E+00	2.119E+02	1.158E+05
OFFSITE COSTS AT $1000/P-REM	0.000E+00	3.321E+03	5.134E+05
TOTAL AVERTED ON & OFFSITE COSTS			
(BASED ON COMPUTED COSTS)	6.732E+00	5.314E+04	1.284E+06
(BASED ON $1000/P-REM)	6.732E+00	7.626E+04	1.500E+06

SAFETY OPTION :P2--CRD IN SBO
VALUE-IMPACT ANALYSIS

	5TH	MEDIAN	95TH
CHANGE IN CORE MELT FREQUENCY	2.699E-07	1.067E-06	3.283E-06
COSTS:			
INSTALLATION & ENG. COSTS	1.500E+05	4.800E+05	1.500E+06
OPERATING & MAINT. COSTS	8.581E+04	2.403E+05	2.574E+06
REPLACEMENT POWER DURING INST.	0.000E+00	0.000E+00	0.000E+00
REPLACEMENT POWER IN OPERATION	0.000E+00	0.000E+00	0.000E+00
TOTAL COSTS	2.358E+05	7.203E+05	4.074E+06
BENEFITS			
AVERTED ON-SITE COST	2.031E+04	7.903E+04	2.470E+05
AVERTED OFFSITE COSTS			
AVERTED PROPERTY DAMAGE	4.036E+01	2.790E+03	1.344E+04
VALUE OF AVERTED PROMPT FATALITY	9.944E-03	2.021E+00	1.901E+01
VALUE OF AVERTED EARLY ILLNESS	2.823E-02	5.188E+00	4.021E+02
VALUE OF AVERTED LAT. CANCER	3.533E+01	6.935E+02	3.270E+03
TOTAL AVERTED OFFSITE COSTS	7.633E+01	3.596E+03	1.656E+04
OFFSITE COSTS AT $1000/P-REM	1.935E+03	2.118E+04	1.333E+05
TOTAL AVERTED ON & OFFSITE COSTS			
(BASED ON COMPUTED COSTS)	2.066E+04	8.451E+04	2.600E+05
(BASED ON $1000/P-REM)	2.652E+04	1.178E+05	3.320E+05

Table D-10 (Continued)
DETAILED LLH COST-BENEFIT COMPARISONS: CRAC2 CONSEQUENCES

SAFETY OPTION :P3&M1_FIRE PUMP IN SBO & ADS W/O D.C.
VALUE-IMPACT ANALYSIS

	5TH	MEDIAN	95TH
CHANGE IN CORE MELT FREQUENCY	2.930E-07	1.968E-06	2.005E-05
COSTS:			
INSTALLATION & ENG. COSTS	3.000E+06	4.700E+06	1.400E+07
OPERATING & MAINT. COSTS	1.287E+06	1.836E+06	3.673E+06
REPLACEMENT POWER DURING INST.	0.000E+00	0.000E+00	0.000E+00
REPLACEMENT POWER IN OPERATION	0.000E+00	0.000E+00	0.000E+00
TOTAL COSTS	4.287E+06	6.536E+06	1.767E+07
BENEFITS			
AVERTED ON-SITE COST	3.093E+04	1.455E+05	1.508E+06
AVERTED OFFSITE COSTS			
AVERTED PROPERTY DAMAGE	1.749E+02	5.603E+03	1.143E+05
VALUE OF AVERTED PROMPT FATALITY	8.452E-03	4.319E+00	7.618E+01
VALUE OF AVERTED EARLY ILLNESS	4.625E-02	8.949E+00	6.772E+02
VALUE OF AVERTED LAT. CANCER	1.460E+02	1.539E+03	2.046E+04
TOTAL AVERTED OFFSITE COSTS	3.445E+02	7.274E+03	1.350E+05
OFFSITE COSTS AT $1000/P-REM	5.365E+03	4.998E+04	6.463E+05
TOTAL AVERTED ON & OFFSITE COSTS			
(BASED ON COMPUTED COSTS)	3.177E+04	1.584E+05	1.406E+06
(BASED ON $1000/P-REM)	4.465E+04	2.137E+05	1.846E+06

SAFETY OPTION :M1--ADS W/O D.C. MITIGATION OPTION
VALUE-IMPACT ANALYSIS

	5TH	MEDIAN	95TH
CHANGE IN CORE MELT FREQUENCY	0.000E+00	0.000E+00	0.000E+00
COSTS:			
INSTALLATION & ENG. COSTS	3.000E+06	4.700E+06	1.400E+07
OPERATING & MAINT. COSTS	8.581E+04	1.201E+05	2.403E+05
REPLACEMENT POWER DURING INST.	0.000E+00	0.000E+00	0.000E+00
REPLACEMENT POWER IN OPERATION	0.000E+00	0.000E+00	0.000E+00
TOTAL COSTS	3.086E+06	4.820E+06	1.424E+07
BENEFITS			
AVERTED ON-SITE COST	0.000E+00	0.000E+00	0.000E+00
AVERTED OFFSITE COSTS			
AVERTED PROPERTY DAMAGE	-3.415E+01	1.380E+03	1.980E+04
VALUE OF AVERTED PROMPT FATALITY	-1.106E-01	1.143E+00	1.680E+01
VALUE OF AVERTED EARLY ILLNESS	-5.436E-02	2.518E+00	1.772E+02
VALUE OF AVERTED LAT. CANCER	-1.104E+02	4.329E+02	4.412E+03
TOTAL AVERTED OFFSITE COSTS	-2.486E+02	1.784E+03	2.490E+04
OFFSITE COSTS AT $1000/P-REM	-1.063E+04	1.185E+04	2.368E+05
TOTAL AVERTED ON & OFFSITE COSTS			
(BASED ON COMPUTED COSTS)	-4.641E+02	1.733E+03	2.354E+04
(BASED ON $1000/P-REM)	-1.178E+04	1.144E+04	2.334E+05

434

Table D-10 (Continued)

DETAILED LLH COST-BENEFIT COMPARISONS: CRAC2 CONSEQUENCES

SAFETY OPTION :M2--CURB, ADS, & VENT MITIGATION OPTIONS
VALUE-IMPACT ANALYSIS

	5TH	MEDIAN	95TH
CHANGE IN CORE MELT FREQUENCY	0.000E+00	0.000E+00	0.000E+00
COSTS:			
INSTALLATION & ENG. COSTS	8.100E+06	1.300E+07	3.500E+07
OPERATING & MAINT. COSTS	1.716E+05	2.403E+05	4.806E+05
REPLACEMENT POWER DURING INST.	0.000E+00	0.000E+00	0.000E+00
REPLACEMENT POWER IN OPERATION	0.000E+00	0.000E+00	0.000E+00
TOTAL COSTS	8.272E+06	1.324E+07	3.548E+07
BENEFITS			
AVERTED ON-SITE COST	0.000E+00	0.000E+00	0.000E+00
AVERTED OFFSITE COSTS			
AVERTED PROPERTY DAMAGE	-2.870E+04	2.104E+03	6.569E+04
VALUE OF AVERTED PROMPT FATALITY	-2.797E+01	1.439E+00	6.656E+01
VALUE OF AVERTED EARLY ILLNESS	-9.034E+01	6.421E+00	1.233E+03
VALUE OF AVERTED LAT. CANCER	-6.548E+03	2.758E+02	1.378E+04
TOTAL AVERTED OFFSITE COSTS	-3.958E+04	2.527E+03	6.584E+04
OFFSITE COSTS AT $1000/P-REM	-3.457E+05	3.474E+02	4.560E+05
TOTAL AVERTED ON & OFFSITE COSTS			
(BASED ON COMPUTED COSTS)	-4.280E+04	2.516E+03	6.428E+04
(BASED ON $1000/P-REM)	-3.839E+05	2.829E+02	4.493E+05

SAFETY OPTION :M3--CURB MITIGATION OPTION
VALUE-IMPACT ANALYSIS

	5TH	MEDIAN	95TH
CHANGE IN CORE MELT FREQUENCY	0.000E+00	0.000E+00	0.000E+00
COSTS:			
INSTALLATION & ENG. COSTS	5.000E+06	8.000E+06	2.000E+07
OPERATING & MAINT. COSTS	0.000E+00	0.000E+00	0.000E+00
REPLACEMENT POWER DURING INST.	0.000E+00	0.000E+00	0.000E+00
REPLACEMENT POWER IN OPERATION	0.000E+00	0.000E+00	0.000E+00
TOTAL COSTS	5.000E+06	8.000E+06	2.000E+07
BENEFITS			
AVERTED ON-SITE COST	0.000E+00	0.000E+00	0.000E+00
AVERTED OFFSITE COSTS			
AVERTED PROPERTY DAMAGE	-1.077E+01	6.323E+02	2.630E+04
VALUE OF AVERTED PROMPT FATALITY	-8.317E-03	5.734E-01	3.243E+01
VALUE OF AVERTED EARLY ILLNESS	-1.643E-02	1.313E+00	2.966E+02
VALUE OF AVERTED LAT. CANCER	-3.007E+00	1.880E+02	5.274E+03
TOTAL AVERTED OFFSITE COSTS	-1.942E+01	8.651E+02	3.159E+04
OFFSITE COSTS AT $1000/P-REM	-1.127E+03	4.331E+03	1.064E+05
TOTAL AVERTED ON & OFFSITE COSTS			
(BASED ON COMPUTED COSTS)	-2.584E+01	8.643E+02	3.157E+04
(BASED ON $1000/P-REM)	-1.409E+03	4.262E+03	9.340E+04

Table D-10 (Continued)

DETAILED LLH COST-BENEFIT COMPARISONS: CRAC2 CONSEQUENCES

SAFETY OPTION :M4--DRYWELL SPRAYS MITIGATION OPTION
VALUE-IMPACT ANALYSIS

	5TH	MEDIAN	95TH
CHANGE IN CORE MELT FREQUENCY	0.000E+00	0.000E+00	0.000E+00
COSTS:			
INSTALLATION & ENG. COSTS	1.500E+05	4.800E+05	5.000E+06
OPERATING & MAINT. COSTS	8.581E+04	2.403E+05	5.149E+06
REPLACEMENT POWER DURING INST.	0.000E+00	0.000E+00	0.000E+00
REPLACEMENT POWER IN OPERATION	0.000E+00	0.000E+00	0.000E+00
TOTAL COSTS	2.358E+05	7.203E+05	1.015E+07
BENEFITS			
AVERTED ON-SITE COST	0.000E+00	0.000E+00	0.000E+00
AVERTED OFFSITE COSTS			
AVERTED PROPERTY DAMAGE	-6.412E+03	2.542E+02	4.581E+03
VALUE OF AVERTED PROMPT FATALITY	-5.854E+00	3.777E-01	8.128E+00
VALUE OF AVERTED EARLY ILLNESS	-3.484E+01	3.306E-01	2.283E+01
VALUE OF AVERTED LAT. CANCER	-1.049E+03	1.189E+02	1.421E+03
TOTAL AVERTED OFFSITE COSTS	-7.325E+03	4.149E+02	5.459E+03
OFFSITE COSTS AT $1000/P-REM	-2.537E+04	6.367E+03	6.021E+04
TOTAL AVERTED ON & OFFSITE COSTS			
(BASED ON COMPUTED COSTS)	-8.708E+03	4.121E+02	5.417E+03
(BASED ON $1000/P-REM)	-2.795E+04	6.289E+03	5.497E+04

SAFETY OPTION :M5--VENT MITIGATION OPTION
VALUE-IMPACT ANALYSIS

	5TH	MEDIAN	95TH
CHANGE IN CORE MELT FREQUENCY	0.000E+00	0.000E+00	0.000E+00
COSTS:			
INSTALLATION & ENG. COSTS	1.000E+05	3.200E+05	1.000E+06
OPERATING & MAINT. COSTS	8.581E+04	2.403E+05	5.149E+06
REPLACEMENT POWER DURING INST.	0.000E+00	0.000E+00	0.000E+00
REPLACEMENT POWER IN OPERATION	0.000E+00	0.000E+00	0.000E+00
TOTAL COSTS	1.858E+05	5.603E+05	6.149E+06
BENEFITS			
AVERTED ON-SITE COST	0.000E+00	0.000E+00	0.000E+00
AVERTED OFFSITE COSTS			
AVERTED PROPERTY DAMAGE	-3.031E+04	-1.588E+02	8.665E+03
VALUE OF AVERTED PROMPT FATALITY	-3.502E+01	-2.300E-01	8.541E+00
VALUE OF AVERTED EARLY ILLNESS	-1.382E+02	-7.322E-02	1.068E+02
VALUE OF AVERTED LAT. CANCER	-7.330E+03	-1.957E+02	1.527E+03
TOTAL AVERTED OFFSITE COSTS	-3.989E+04	-3.630E+02	1.019E+04
OFFSITE COSTS AT $1000/P-REM	-3.240E+05	-1.164E+04	6.188E+04
TOTAL AVERTED ON & OFFSITE COSTS			
(BASED ON COMPUTED COSTS)	-4.302E+04	-3.635E+02	1.009E+04
(BASED ON $1000/P-REM)	-3.542E+05	-1.205E+04	4.537E+04

Table D-10 (Continued)

DETAILED LLH COST-BENEFIT COMPARISONS: CRAC2 CONSEQUENCES

SAFETY OPTION :M6--GLOBAL FIRE SPRAYS MITIGATION OPTION
VALUE-IMPACT ANALYSIS

	5TH	MEDIAN	95TH
CHANGE IN CORE MELT FREQUENCY	0.000E+00	0.000E+00	0.000E+00
COSTS:			
INSTALLATION & ENG. COSTS	2.500E+06	6.000E+06	1.500E+07
OPERATING & MAINT. COSTS	2.403E+06	3.433E+06	6.865E+06
REPLACEMENT POWER DURING INST.	0.000E+00	0.000E+00	0.000E+00
REPLACEMENT POWER IN OPERATION	0.000E+00	0.000E+00	0.000E+00
TOTAL COSTS	4.903E+06	9.433E+06	2.187E+07
BENEFITS			
AVERTED ON-SITE COST	0.000E+00	0.000E+00	0.000E+00
AVERTED OFFSITE COSTS			
AVERTED PROPERTY DAMAGE	-2.720E+01	1.346E+03	1.293E+05
VALUE OF AVERTED PROMPT FATALITY	-9.104E-03	1.376E+00	9.944E+01
VALUE OF AVERTED EARLY ILLNESS	-2.500E-01	1.272E+00	6.317E+02
VALUE OF AVERTED LAT. CANCER	-3.698E+00	5.204E+02	2.251E+04
TOTAL AVERTED OFFSITE COSTS	-2.436E+01	1.914E+03	1.618E+05
OFFSITE COSTS AT $1000/P-REM	-5.305E+03	9.182E+03	5.068E+05
TOTAL AVERTED ON & OFFSITE COSTS			
(BASED ON COMPUTED COSTS)	-2.519E+01	1.827E+03	1.216E+05
(BASED ON $1000/P-REM)	-6.204E+03	9.162E+03	5.010E+05

References for Appendix D

1. Gallup, D. R., et al. *Cost Benefit Analysis of Adding a Feed and Bleed Capability to Combustion Engineering PWRs* U. S. Nuclear Regulatory Commission Report NUREG/CR-3421, Sandia National Laboratories, Albuquerque, NM: August, 1983.

2. Evans, L. R., et al. *Analysis of Nuclear Backfitting Issues to Support Recommendations for Regulatory Reform* U. S. Department of Energy Report ALO-1025, International Energy Associates Limited, Washington, DC: August, 1984.

Appendix E

SUMMARY OF REVIEW TEAM COMMENTS CONCERNING THE LIMITED LATIN HYPERCUBE ANALYSIS AS IMPLEMENTED IN SARRP

439

Appendix E

SUMMARY OF REVIEW TEAM COMMENTS CONCERNING THE LIMITED LATIN HYPERCUBE ANALYSIS AS IMPLEMENTED IN SARRP

The members of the expert review group assembled for SARRP were asked to provide comments concerning their views on the limited Latin hypercube (LLH) methodology being utilized for uncertainty and sensitivity analysis. This appendix summarizes the reviewers' comments which were provided at their meeting of April 3, 1986. The attendees at this meeting each had direct familiarity with the LLH process, through their participation in the process of providing expert opinion regarding the formulation and characterization of the uncertainty issues. The comments that follow were taken directly from a tape recording of the meeting. It should be noted that time for discussion was limited at the meeting, and several participants hoped to follow their comments with more specific, written comments. Some of the discussion related specifically to the interim risk results for Surry that were presented to illustrate the process and to stimulate the discussion, and those comments are discussed as appropriate in other parts of this report. The summary that follows assumes fairly intimate knowledge of the SARRP methodology, as well as the history involved in its development.

In general, the reviewers felt that the uncertainty approach being pursued by SARRP was about the best that could be done within time and budget constraints. Most then focused their discussion on areas of concern regarding possible biases or misinterpretation of the results.

Introduction by SARRP Management

Dr. Allan Benjamin of Sandia initiated the session with a brief review of the uncertainty approaches employed in SARRP. He also provided some initial results for the Surry plant that were obtained using both the LLH and optimistic/central/pessimistic (OCP) approaches. He explained that through interactions of SARRP personnel, review groups, and NRC staff, the LLH approach was developed in order to address the significant drawback of the OCP approach, which was the initial method selected. That drawback concerns the lack of ability to characterize the relative likelihoods of the outcomes, i.e., the degree of optimism and pessimism in the results. The LLH method allowed the development of a distribution of possible outcomes (in terms of the risk results) generated by variation of a specific number of uncertain inputs, which were termed issues in this study. The method was generally developed to allow study of phenomenological uncertainties associated with core, containment, and source term processes. The distributions are developed from weighting factors provided by a group of individuals knowledgeable about the issues and current research and opinions on the subjects. The results therefore provide insights concerning the relative importance of particular sources of uncertainty selected for study. The method does not produce a statistical definition of uncertainty due to the inherent limitations on scope. While the LLH approach did not provide a perfect solution, it was agreed that it was the best available under the circumstances. The uncertainty approaches are described in Sections 2 and 4 of the main report.

The presentation of the interim results served to stimulate the discussion of the appropriateness of the LLH methods proposed for use in the program. Some discussion of details ensued, but the participants in the meeting generally offered higher-level comments concerning the methodology itself.

The attendees at the LLH meeting who participated in this discussion are listed below. The specific comments discussed in this report are attributed to individuals by number only, and the listing below does not correspond to the numerical listing in the text.

Participants in April 3, 1986 Discussion of LLH Methodology

M. Ernst, U.S. Nuclear Regulatory Commission
R. Denning, Battelle Columbus Laboratories
S. Hodge, Oak Ridge National Laboratory
J. Gieseke, Battelle Columbus Laboratories
J. Mitchell, U.S. Nuclear Regulatory Commission
T. Kress, Oak Ridge National Laboratory
M. Berman, Sandia National Laboratories*
A. Benjamin, Sandia National Laboratories
G. Greene, Brookhaven National Laboratory
M. Corradini, University of Wisconsin
C. Hofmayer, Brookhaven National Laboratory
H. Ashar, U.S. Nuclear Regulatory Commission
G. Boyd, SAROS, Inc.

Objectives of the Discussion

The SARRP and NRC managers provided guidance concerning their objectives in soliciting comments from those involved in the LLH process. There are obviously limitations in the process used in SARRP to assess uncertainty, and these need to be clearly understood before conclusions are drawn. There are several intended uses of the products of the SARRP analyses relative to NUREG-1150 that also require consideration. The SARRP results will be examined to determine if the estimated risks are acceptable, including the risk represented by reasonable bounds about the central estimates. The key drivers of risk need to be identified in order to understand the system features and phenomena that contribute to the risk estimates. Reasonable uncertainty estimates are also needed to draw conclusions regarding these contributors. The goal of the LLH process was to establish "reasonable" ranges of uncertainty. The definition of a reasonable range is clearly a matter of judgment, and it is very important that all terminology used in the study be carefully defined. After months of consideration, a statement of the scope and objectives of the uncertainty analysis has been developed by Sandia and NRC. Additional input concerning the LLH methodology was sought from the attendees at this meeting to ensure that the analysis is as fully understood as possible, including both its benefits and limitations.

---

*This reviewer was not able to attend the April 3 meeting, but provided written comments subsequent to the meeting.

Concerning the relationship of the SARRP analyses to the NRC position papers being developed for specific issues, it was stated that the position papers will definitely be developed by the NRC staff, based on all available inputs. If the SARRP study suggests different conclusions from those in a NRC position paper, it will be necessary to attain some sort of resolution. Currently the position papers are generally lagging the treatment of the same issues in SARRP, and interaction has been somewhat limited.

One of the concerns is the need to translate the discussion and assignment of weighting factors provided in the meetings of the experts into inputs for the LLH analysis in a clear and appropriate manner. The meetings have been dynamic in nature, and it is not clear that all of the input provided in the meetings can be properly characterized within the framework of the study. The process of developing inputs based on expert opinion will be subject to criticism due to the degree of interaction that took place, and the views of those participating in the program are needed in order for SARRP and the NRC to have a full appreciation of the results.

There is also reason for concern about limitations that would cause an important contributor to be missed. Time and budget constraints alone have limited the efforts in the program. The questions of whether or not all of the actual contributors to risk and to uncertainty have been identified and to what degree small variations in the input could change the results are also important in this regard. It is also important to assess the degree to which the plant-specific analyses can be used to form the basis for drawing more generic conclusions. Some of the results appear to be due to relatively subtle plant features that will limit the ability to draw conclusions for other plants.

In summary, the meeting attendees were asked to provide high-level comments concerning the following aspects:

- Their overall opinions regarding the usefulness of the process;

- Their greatest concerns about the LLH approach and the manner in which it was implemented;
- Their opinions concerning how to characterize the results; and
- Their views regarding the ability to use this information to draw more generic conclusions.

Reviewer Comments

The meeting attendees provided comments in response to the objectives stated above. Due to time constraints at the meeting, the discussion was limited to general areas rather than specific items, except as examples. Several participants stated their intent to provide written comments at a later date. The comments are provided for individuals below. Group discussion is also included where appropriate.

Reviewer #1. Reviewer #1 offered a number of observations concerning the collection of the input information and the meaning and presentation of the results. Specific comments are summarized below.

- The results presentation should include a breakdown of the output to allow examination of the relative sensitivities of the uncertainty issues not only to risk, but also to the interim products of the study. For example, the uncertainty in containment loading and response should be examined relative to key measures, such as the frequency of early containment failure. The source terms should be similarly characterized in terms of release fractions of key species. After publication of the results, most of the users will want to carry the results further to assess their broader implications. This will involve the need to decompose the results as described above, a task best performed by the SARRP analysts. The reporting will need to include discussion of the subtleties and the limitations of the methods used. The most desirable situation would be for the SARRP analysts to have thought through this process before the same questions are asked by others.
- The process of soliciting expert opinion used in this program will be the subject of considerable criticism, and it will be argued that this is a fatal flaw. The key area of concern is the reviewer interaction. It is essentially a no-win situation; if there were no interactions, some would say that the reviewers might not have been supplying input coherently, while others will say that the interaction led to an inappropriate narrowing of the uncertainty range. There is no good solution to this dilemma, although there may be ways to partially assess the impact of the interactions. The input for the Surry plant was somewhat unique since it was the first plant, and the reviewers had generally prepared their responses in advance of the meeting. The Surry input therefore offers the potential for some examination of the sensitivity of the methodology. One test would be to compare the original inputs of one or two reviewers with their final input. Another test would involve the use of the reviewers' inputs as the sensitivity cases, rather than use of the composite input of all of the reviewers. These tests may provide insight to help respond to future criticism.

- The results should also address their applicability to other plants. It would appear that the results indicate the importance of plant-specific features as subtle as relative geometries of reactor cavities. These insights should be included in the report.
- The results will be difficult to characterize, since they cannot be represented in statistical terms. If the LLH output is referred to as a representation of uncertainty rather than the result of a sensitivity study, the limitations will have to be clearly stated, and all terms will have to be carefully defined.

Reviewer #2. Reviewer #2 discussed both the methodology and its implementation in SARRP. He planned to supply written comments at a later date.

- All supporting analyses for NUREG-1150 must include uncertainty measures in order to have any viable use. The method developed for SARRP has very serious flaws, but overall this was an appropriate method given all the constraints and the difficulty of the problem. In fact, this appears to be the best method available.
- The LLH methodology allows for correction of known deficiencies in the Source Term Code Package (STCP). He would have more reservations about the program if there were no method for correcting for these deficiencies.
- There are many problems involving the subjectivity of the process. First, the participants were forced to provide unsubstantiated guesses as input for many issues that could at least have been based on calculations had schedule and budget allowed. In some cases, nothing could have been done to narrow the uncertainty, short of years of research. In many other cases, the input could have been based on evidence and calculation, but the participants had to provide input without benefit of additional calculation. It would have cost millions of dollars to do that for each issue, but very important issues should be based on the best knowledge available. It should be one of the promises of NUREG-1150 that these issues will be addressed fully in the future.
- There is a significant risk that the LLH process will narrow the uncertainty bounds associated with accident phenomenology, since not all issues have been included and the range of input in terms of participants was somewhat limited. The users of the output must be careful to eliminate a concern based on the LLH output alone, and the quantitative results must be used very carefully.
- The results should be characterized as a qualified uncertainty analysis. The project should not be wishy-washy in its statement of what was done by calling it a sensitivity study. The uses of NUREG-1150 will require an uncertainty characterization, and this LLH process is the uncertainty analysis for the program. The report will need to define the terminology and limitations very carefully.
- When asked to compare the SARRP analyses to the Reactor Safety Study, the reviewer stated that there were very clear advances in the technology, and the uncertainty approach was obviously an improvement, since the RSS did not treat phenomenological uncertainties. However, the RSS fell on its

444

face because even though it contained a significant amount of good work, weaknesses in presentation tended to hide the advances made. SARRP will run the same risk unless the presentation of the entire process allows others to understand the full scope of the activities and their implications.

Reviewer #3. Reviewer #3 was most concerned about two issues: (1) the guessing during the expert input process, and (2) the deficiencies in the STCP.

- There was a significant amount of unmitigated guessing during the LLH input collection that could have been prevented if participants abstained on issues about which their qualifications were limited. In some cases, it was not clear that the right people were selected to provide the input. In all cases, code calculations should have been given more weight than expert input. Reviewer #3 was questioned as to whether the results were useful given the amount of guessing that was involved. It was his opinion that the results were useful for the objectives of SARRP, but that extensions of the results for other purposes would have many pitfalls.
- The STCP does not include models for a number of phenomena that could be important. This situation is not necessary since there are other models available, although in many cases the models are simple, parametric ones. Good examples include steam explosion, direct heating, and more realistic models for core-concrete interactions. It would be better if the STCP included the effects of direct heating through a code such as DHEAT rather than the addition of the pressures in the LLH process.
- The community is still on the learning curve relative to more unique phenomena that may be very important to risk. For example, SARRP should be praised for including alternative containment failure modes such as liner meltthrough and suppression pool bypass. Phenomena such as these are very plant-specific, but could easily be more important than traditional failure modes such as overpressurization.
- The analyses of some plants benefited from the presence at the LLH input meeting of experts who had actually visited the facilities. There is no substitute for onsite inspection, particularly relative to plant-specific subtleties. Additional input of this type would be desirable.
- The consideration of a full range of radionuclides is important for complete characterization of the risk. The SARRP program included a good breakdown of the types of releases and their severity.
- From this reviewer's perspective, the front-end analysis appears to have serious flaws. The treatment of the operator action to turn on the igniters and the lack of information on the critical SRV tailpipe vacuum breakers were problem areas. These types of issues could drive the risk.

Reviewer #4. Reviewer #4 echoed the opinions of most of the previous reviewers and added one further point:

- The plant-to-plant variations include more than physical differences; the procedural differences could lead to dramatic differences in response for very similar plants. A good example is containment venting at BWRs,

445

which has very different guidance at different plants. This problem also precludes generalization based on these plant-specific studies.

Reviewer #5. Reviewer #5 had some additional comments on the lack of analysis associated with some issues.

- The LLH process requires too much guessing. There is a lack of analysis upon which to base the weighting factors, particularly considering the fact that most participants are using the same basic sources.
- The guessing comes about as a result of an imbalance in the project activities. Some very important issues have had almost no effort devoted to them, whereas a great deal of effort is spent on less important issues. A good example is the request to vote on a pressure increment due to hydrogen burns with limited or no analysis.

Reviewer #6. Reviewer #6 offered some views on similar processes in other programs.

- The Seismic Safety Margins Research Program (SSMRP) included a similar expert-opinion process, although many more experts were involved. The project analysis had difficulty resolving all of the input, because it was not always clear what the participants had intended. In addition, there is considerable interpretation of the request for information which can lead to disconnects among those providing the input. The process used here led to a great advantage in that the participants had the benefit of discussion of the issue to ensure that they were all responding to the same question, the discussion allowed a sharing of insights which did lead to more informed assignment of weighting factors, and the project analysis had access to the reviewers to fully understand how the input was to be used.
- There could be additional benefits to a concise re-review of all of the input provided to date. There has been considerable learning associated with the analysis of the later plants which could be fed back to the first plants studies with the LLH process.

Reviewer #7. Reviewer #7 expanded on some of the concerns that had been raised by other reviewers.

- The approach used in the study will tend to miss the interactions among the issues. The number of correlations included in the LLH study was limited, and although the SARRP analysts have included extensive considerations of correlations and consistency, the LLH study does not allow for full modeling of these correlations. Many of the synergisms are perhaps lost in this process, leading to an oversimplified view of the final output, and perhaps a distorted view of the importance of individual issues. The latest LLH study of the Grand Gulf plant did include one good example of the importance of these synergisms, the scrubbing DFs associated with the various processes in containment. In many cases, the synergisms are predicted, but there is not enough understanding to effectively model the interactions.

- It would have been better if there had been less interaction and subsequent influence within the voting process. The first round, the input for the Surry plant, involved less interaction and more independent thinking. There were some changes as a result of conversation, but nothing like the later plants where the reviewers assessed the situation and developed their inputs within the meeting with limited independent thinking. The discussions in the meeting tended to narrow the uncertainty ranges to the point at which, if discussion lasted long enough, everyone tended to agree. Even when two or more individuals had polarized viewpoints, the output eventually tended to be the same.

  Several others noted that while the reviewers did tend to agree on the weighting factors, the ranges still reflected the wide variation in opinion. Reviewer #7 still believed that the weighting factors and ranges would have been quite different without the interactions within the meetings.

- Again, there were too many guesses; in some cases the guesses resulted from entirely uninformed opinions. One way to test the process is to select a few cases in which reviewer input was used in lieu of code calculations. A code calculation could be performed for some issues such as pressure increments, and the results could be compared to the weighting factors assigned without benefit of the calculations. This could provide some level of confidence that the process works.

- Another potential problem with the process involved the selection of the ranges for the possible outcomes associated with each issue. The SARRP analysts provided ranges which very heavily influenced the reviewer input. If it were possible, the discussion of the issue should have been used by a third party to develop a range based on what people had said. The discussion at the meeting appears to be a better source of information than the voting outcomes which indicated less uncertainty. Once again, the process appeared to work toward agreement rather than a full display of uncertainty. Another good test would be to conduct a second vote for some issues after changing the ranges. There is a psychological factor involved in the process, since people tend to have preconceived notions of how their input should fit into a range that is supplied, and removal of levels at either end of the range would likely lead to different input, perhaps producing different interpretations and conclusions.

Reviewer #8. Reviewer #8 offered considerable praise to the SARRP analysts for implementing a difficult process, although he was concerned about the acceptance of the results by others.

- The results of this study must include uncertainty measures. The central estimates are misleading without the additional insight provided by the uncertainty analysis.

- The process used in the study is a good one, and the best available under the circumstances. This is an efficient way of including expert opinion. The

SARRP analysts should be commended for their responsiveness in implementing the input of the group.

- There were, however, too many guesses on the part of the expert reviewers that were not based on any calculations.
- The display of the results should include both a breakdown of the importance of the issues to measures of risk as well as to intermediate products, such as source terms and containment failure modes.
- This reviewer, along with others at the meeting, had some concerns about the methods used to link the consequence analysis to the rest of the analysis, particularly with respect to the treatment of warning times. It will require care to avoid losing information and perhaps overlooking some subtleties.
- Others have been promised that NUREG-1150 will provide a risk perspective to the new source term technology. However, it is a no-win situation for the following reasons:
  - If the results, and particularly the uncertainty ranges, tell us that the new source term technology does not allow for any relaxation of regulatory requirements, there will be an outcry from those who believe that there has been considerable progress which is not demonstrated in the SARRP results.
  - If the results and the uncertainty ranges both indicate that the risk is very low and some regulatory changes might be called for, they will be impossible to implement. None of the analysis performed would stand up under scrutiny. The input cannot be defended as having a sound basis, particularly when considering the health and safety of the public. Anyone who wants to make a case against the results or the process used to obtain them will be able to.

  The results, therefore, will be criticized, and many of the criticisms will be valid. Reviewers will easily be able to see that the study was hurried, the important issues involved guesswork rather than analysis, and there was a somewhat incestuous relationship among reviewers, particularly since most of those providing input were basing it on the same sources.
- When asked about the viability of the process given the problems stated, Reviewer #8 stated that the process was good given the constraints, but that it would be easier to be a critic than a defender. When asked to compare the output to that from the RSS, he stated that the source term information was clearly an advance, but that he didn't know if the probabilities were more viable.

Reviewer #9. Reviewer #9 had strong opinions on the characterization of the results:

- The activities of the LLH review team clearly do not define uncertainty. In fact, the request for input and the groundrules explicitly stated that it was not the goal to define uncertainty, and that was the reason for the approach using ranges and weighting factors selected for the study. There is no demonstration that this process has addressed uncertainty; rather, the sensitivity of key issues has been addressed within a framework that has severe limitations.

448

Reviewer #10. Reviewer #10 was not directly involved as an expert reviewer in the LLH process, but commented on the scope of the uncertainty analysis. He offered to supply additional written comments as well.

- The LLH process cannot be characterized as an uncertainty analysis, since the range of input was limited. The LLH inputs do not really indicate the industry perspective, and it will be quite possible that results by other groups will fall outside the range allowed by the LLH study, making it difficult to call the LLH study an uncertainty analysis. Since issues tend to mix together, the actual risk calculations may be similar between the NRC analyses and those of the industry, and that may be sufficient. However, all of the inputs will likely be different, and there will be little agreement on the main issues. In some cases, the industry results were represented in the LLH ranges, but the weighting factors assigned caused the bounds of the range to be sampled too infrequently to be represented in the uncertainty. The LLH analysis is driven by the selection of the participants; hence, the output is no more than a sensitivity study. It was pointed out that the industry is doing its own analysis, and the result will be an examination of risk from two perspectives. The LLH study will have to be carefully described in terms of its limitations to ensure appropriate usage.

Reviewer #11. Reviewer #11 was unable to attend the meeting on April 3, 1986, but provided written comments at a later date. Those comments are reproduced here verbatim.

> "In the SARRP report for Surry, I am listed as a member of the SARRP Containment Event Tree Review Group. Although I did participate and provide my numerical 'weighting factors,' additional discussion and explanations are required before my opinions can be properly evaluated. I believe that the study has provided many useful insights into risk analysis. Nothing that I write here should be construed to attack the excellent work done to diagnose many accident sequences, delineate the important phenomena, and to determine a defensible range for many parameters.
>
> "My concern lies solely with the use of subjective probabilities/weighting factors in narrowing ranges and providing numerical probability density functions (PDFs). The numbers and PDFs which I provided were, in most cases, merely guesses; the numerical 'weighting factors' cannot be defended in any scientific fashion in a quantitative sense, although they may have some value with respect to relative, but qualitative, comparisons. I believe that these qualifications also apply to the numerical probabilities supplied by others.
>
> "I do not for a moment question the sincerity or integrity of the participants, organizers or sponsors of this work. I quarrel only with the use of Personal Opinion Probabilities (POPs) in the context of risk assessments.
>
> "I believe that an important goal of the SARRP study is to provide estimates of risk uncertainties that are narrower than could be derived based on bounding analyses. In the absence of additional data, the only way to achieve this goal is to poll experts for their opinions. However, I believe that uncertainty cannot be legitimately reduced by such a process.

"It is very difficult to arrive at the truth with a finite amount of data and a reasonable set of models. To provide numerical probabilities in the absence of data or validated models is an extremely risky proposition [1]. Although all the well-intentioned people involved in this process are as aware of its pitfalls as I am, they still participate. Why?

"The primary justification is usually that decisions must be made now and we don't have time or money to do the necessary research. The statement, however, becomes a self-fulfilling prophecy. We may be spending more on POP polls today than we are on phenomenological research. Consider the following paradox. On one hand, the POP polls are justified because there is a need to make a decision now. On the other hand, to the best of my knowledge no decision based on POPs has ever been made; and if a decision were ever based on such a poll, the NRC would have difficulty defending it in any technical forum.

"I do not believe that regulatory decisions should be or need to be based on POP polls. If a decision must be made that requires additional knowledge, then that additional knowledge should be procured. Interim decisions can be based on any or all of the following:

(1) Existing regulations.

(2) Conservative calculations.

(3) Bounding calculations.

(4) POP values of 0.5.

(5) Qualitative judgments of relative risk.

(6) Extrapolation of existing data bases, where appropriate.

(7) A strong desire to minimize high-consequence accidents, regardless of estimated probability.

(8) PRAs based on statistical data and validated models.

"The problem with using POPs is that they could be, and often are, completely wrong. That can lead to false complacency and increased risk, as may have happened with the Challenger and Chernobyl accidents.

"Because of the ambiguity of the definition of probability (or weighting factor), a POP poll does not distinguish between an expert's degree of belief that an event will (or will not) occur, or his guess at the *frequency* with which an event would occur if data were available. In the former case, the expert is providing his gambler's estimate of what will happen; in the latter case, he is providing his prediction or prophecy of the outcome of a future set of trials. Hence, a POP expert must assume either the role of gambler or prophet when he provides his subjective probability. In either of these roles, historical and scientific evidence [1] indicate that he will often greatly understate the true uncertainties. I believe that the SARRP study also underestimated uncertainties for this and the following reasons:

(1) Peer pressure. The subtle pressure of the group to force conformity. The effect of this force is evident in the obvious conformity in many POPs which are incompatible with the actual uncertainties.

450

(2) Latin Hypercube limitations. The limited staff time available limited the sample size, which would tend to narrow the uncertainty range. Also, for some issues, the range of levels was too wide, with the possible under- or over-stating of the importance of those issues.

(3) Best-estimates. Experts were generally asked for their best-estimate points or PDFs, rather than uncertainty intervals or ranges of different PDFs. One of the objectives of the SARRP study was to 'provide a quantitative estimate of uncertainty that reflects a credible and realistic range in which the analysts have a reasonable confidence that the correct answer lies.' If I had been asked what my 'credible and realistic range' was, the numbers would have been much wider than the published numbers.

(4) Lack of a phenomenological understanding of some important processes.

(5) A wide variety of psychological factors such as subconscious desire to be perceived as a supporter of nuclear power, desire to appear knowledgeable, desire to maintain program funding, etc. [1].

"The SARRP investigators made a valiant attempt to produce a quantitative assessment of risk. However, I believe that that goal is impossible based on what we know today. The excellent work by the investigators, however, should not be wasted simply because of the reliance on indefensible POP polls. I would make the following suggestions to the investigators.

"In many cases, SARRP used existing data and models to establish technically defensible ranges for some parameters. The experts were then asked to narrow these ranges by providing point estimates or subjective PDFs. An alternative approach is possible. Assume that all PDFs are possible over the existing interval, ranging from a uniform distribution to a delta function at any point within the range. The first set of risk estimates could then be performed by assuming uniform distributions, or equal likelihoods. This would provide the central estimate (but not necessarily best estimate) of risk. Next, the study could explore the consequences of different assumptions. A sensitivity study could assume that parameters are forced to lie, e.g., within 1/3 of the range (high, middle or low). The study would then determine the underlying assumptions or parameters which have the most influence on risk. This information would be highly valuable to the NRC in determining the research questions of greatest potential impact. Finally, bounding calculations (delta functions at the pessimistic and optimistic extremes) could be performed to see if these assumptions can dominate risk under certain conditions.

"The benefit of the above approach is that the space of all possible probabilities and PDFs would be explored. The study would be far less subjective since it would not involve either gambler's estimates or prophecies. The scientific validity of the study would depend only on the defense of the ranges employed, and the completeness of the analysis. Given a decent job on these two items, the study could not be shown to be wrong, nor could it mislead the NRC. The use of POP polls tends to reduce uncertainties, but without any technical justification. The suggested sensitivity study indicates where the *major* sensitivities lie, and where expert agreement should be achieved by generating solid evidence.

"I would like to leave the readers of the SARRP study with one final quote from Jean de la Bruyere (1645-1696): 'The exact contrary of what is generally believed is often the truth.' "

Summary

Most of the reviewers agreed that the uncertainty in the SARRP analyses must be addressed and that the LLH method provided the best mechanism for doing this within the time and budget constraints of the program. Since the objective of the discussion was an airing of concerns about the approach, the specific comments are focused on potential problems in interpretation or implementation. Several reviewers also pointed out that the topic of uncertainty representation was so controversial that no method could be chosen that would not be subject to strong criticism.

As indicated above, there were two concerns most frequently voiced at the meeting:

(1) The LLH input process involved substantial guessing at parameters or outcomes that could have been avoided had more time been available.

(2) The results will need to be carefully characterized in terms of what they mean and what they do not mean. The semantics are very important. The group was split in their advice on this issue, however, since some wanted the results to be presented as a characterization of uncertainty, while others thought that they should be presented as the outcomes of sensitivity studies.

There were a number of specific concerns that were also raised as described in the comments of the individual reviewers. The group also endorsed a very careful presentation of the results that will help others understand the implications of the results on several levels.

References for Appendix E

1. Berman, M. "Vapor Explosions - Physics and Philosophy," presented at the Conference on High Temperature Chemistry, Wolfeboro, New Hampshire: July 23, 1986.

Appendix F

DATA BASE FOR ESTIMATION OF COST AND PERSONNEL DOSE FOR PROPOSED MODIFICATIONS

453

CONTENTS

Section ... Page

F.1 COST INFORMATION NEEDS ... F-1 -156

F.2 SOURCES OF DATA AND THEIR GROUNDRULES ... F-3 -158

  F.2.1 Alternative Decay Heat Removal Study ... F-3

  F.2.2 Filtered-Vented Containment Systems Study ... F-3

  F.2.3 Severe Accident Mitigation Systems Study ... F-4 -159

  F.2.4 Plant-Specific Analyses in Support of the Decay Heat Removal Generic Issue Program ... F-5 -160

  F.2.5 AIF Working Group ... F-6 -161

  F.2.6 EPRI Value/Impact Study ... F-7 -162

  F.2.7 Mitigation Systems for Mark II Reactors ... F-7

  F.2.8 Other Cost Data Sources ... F-8 -163

F.3 USE OF THE DATA BASE FOR COST ESTIMATION ... F-8

F.4 UNCERTAINTY IN COST ESTIMATION ... F-9 -164

F.5 RADIATION EXPOSURE ESTIMATION ... F-12-167

F.6 COST DATA BASE ... F-12

References for Appendix F ... F-48 -503

454

LIST OF TABLES

Table Page

F-1 Radiation Exposure Data Base for Plant Modifications F-13

F-2 Summary of Cost Data Base F-14

Appendix F

DATA BASE FOR ESTIMATION OF COST AND PERSONNEL DOSE FOR PROPOSED MODIFICATIONS

The analysis of risk reduction measures for the individual reference plants required the estimation of costs and personnel radiation exposure associated with proposed plant changes. Since the project schedule did not allow for detailed analysis of all the proposed modifications, previous studies that have generated this type of information were used as the source of information for options not specifically studied in SARRP. While this information is not precise due to the lack of specific design information for a specific plant, other uncertainties in the determination of value/impact measures are such that more accurate cost estimation would not change the overall conclusions. In any case, the costs and exposures developed for each option have been developed as a range, with upper, lower, and central estimates. Decisions regarding the viability and benefits of an option must consider the full range of costs as well as benefits.

F.1 COST INFORMATION NEEDS

Effective evaluation of the value/impact of proposed risk reduction measures requires as complete an estimation of total cost impact as possible. The total onetime cost associated with the option and the annual costs incurred as a result of operating or maintaining the plant after implementing the option are the two key parameters needed for comparison to averted costs associated with the risk reduction.

The total onetime cost estimate is intended to include the following:

- design and study costs
- components and materials
- owner's costs
- initial setup and testing
- taxes
- management and planning
- associated construction costs
- QA and other review
- regulatory interactions
- contingency

The sources of cost information generally treat the most significant of these cost elements, although format and assumptions vary.

The costs are also intended to account for the additional cost associated with backfit of existing facilities, since the reference plants are all operational units. Once again, the cost reference documents have information to help factor this element into the total. However, past experience indicates that there are also unforeseen consequences of a modification which can dramatically change the actual cost versus the original estimate. These circumstances are treated in the uncertainty estimation, as discussed in Section F.4.

Another important and potentially overriding cost consideration is that of replacement power if the modification involves additional downtime over the base case of an unmodified plant. This cost element is variable in magnitude depending on the exact circumstances at the utility at the time of the change. The state-regulated utility rate structure could also impact this element, since modifications that cause downtime may fall into a different category from those that do not. Many previous studies have not included this element because it is difficult to predict and because it is politically driven. In general, the schedule was reviewed to determine if the change could be completed within a normal outage. The possibility of extending the implementation schedule to prevent downtime specifically for the modification is also cited as a reason for not including downtime costs.

In spite of these factors, for many of the major modifications it is probably unreasonable to expect that the change could be made with no impact on the overall plant schedule. Even if a modification schedule indicates that it could be completed within a shutdown period, these estimates do not include the full perspective of the utility and its limitations in managing all other activities that are a part of a normal shutdown. Realistic consideration of the modification integrated with all other plant activities would probably result in the inclusion of some replacement power costs for the larger modifications.

The other cost that is difficult to generically assess is that related to financing and interest charges. The specific utility, the magnitude of the project, and the motivation for implementing a change could all impact the assessment of interest costs. Some of the cost reference sources have included some interest charges, but overall the costs associated with financing the modification are not clearly delineated.

In order to efficiently evaluate the value/impact of many proposed modifications, the estimates of costs were made on a fairly general basis without consideration of the details of implementation at the reference plant. The cost impacts were evaluated as follows:

1. The costs were estimated based on applicable information from other studies, excluding replacement power and specific calculation of interest expense and financing alternatives.
2. A range was developed by establishing high and low estimates as described in Section F.4.
3. The value/impact analysis was completed based on this information.

L 57

4. For any modifications that appeared to have a net benefit, the costs were re-evaluated and the other costs such as replacement power and interest were considered. The specific cases requiring more detailed cost evaluation are documented in the individual appendices for each reference plant.

F.2 SOURCES OF DATA AND THEIR GROUNDRULES

Each of the references had specific methods for the development of cost information. When using the data from separate sources it is necessary to understand these methods and their limitations, particularly when trying to obtain estimates for individual cost elements rather than the total. This section outlines the important groundrules for each of the major references. The individual data listings in Section F.7 also include notes applicable to the specific entries.

F.2.1 Alternative Decay Heat Removal Study

NUREG/CR-2883 includes cost information for three potential alternative decay heat removal systems [1]. These concepts were evaluated in detail for a variety of different types of reactors, although the cost information extracted as part of this effort was based on one plant for each alternative, since the design differences between plants did not lead to significant cost differentials. The key elements of the cost estimates are summarized below:

- The costs are based on the Richardson Estimating Manual [2] and Burns and Roe in-house data. Vendor estimates were obtained for major equipment such as diesel generators.
- The estimates were normalized to fourth quarter 1981 dollars.
- A 25% contingency is included in all elements.
- Outage times were estimated based on rough schedules and estimates of 60-person crews working 40-hour weeks.
- Site-to-site differences were included but were found to be negligible.
- Direct construction costs were estimated. Other costs, including escalation, interest during construction and owner's costs were figured roughly as a constant 45% of construction costs.

F.2.2 Filtered-Vented Containment Systems Study

Reference 3 was the primary source of information for costs associated with proposed concepts of accident mitigation through containment pressure control by filtered venting. This document discusses previous estimates for similar concepts from other studies and also includes new cost information for alternative backfit options designed specifically for

458

a Mark I containment. These specific estimates, by Holmes and Narver, have the following characteristics:

- Different seismic design levels were considered and it was found that the difference in costs between Seismic Categories I and II were negligible.
- A plant downtime of 5 to 15 days was assumed reasonable, at a cost of one million dollars per day. This is kept as a separate item for this study.
- The cost estimates apply for a retrofit or for a new plant.
- A 15% contingency is included.
- Owner's costs (management, QA, regulatory interaction, health physics, retraining, etc.) are not included and there is no allowance for first-of-a-kind costs.

F.2.3 Severe Accident Mitigation Systems Study

A number of proposed mitigation systems were evaluated specifically in conjunction with SARRP [4]. Three mitigation alternatives involving four different systems were evaluated for three different reactor types. For each option, estimates on only one plant were included in the data base since the geographic and plant-to-plant differences were small. The following methods were used in the estimation process:

- Costs were based on conceptual designs, and included evaluation of building construction, electrical loading and other details needed for a fairly accurate representation of costs.
- Labor estimates included consideration of location of work, access difficulty, temporary rigging, etc.
- Typical estimating contingencies were included in the totals.
- Owner's costs including administration, health physics, and others were included.
- No escalation was included due to the lack of a specific implementation schedule and the great degree of uncertainty in escalation rates.
- Interest is not directly included due to the many different options for financing. It was suggested that interest could be estimated as one year's interest on the total onetime cost at the existing interest rate.
- No replacement power costs are included. The work could be scheduled within one shutdown, but it should be recognized that this could require over 300 workers due to health physics requirements.

- The error band on costs, excluding the items that were not included such as replacement power costs, is estimated to be 33%, plus or minus.
- Other costs such as equipment qualification could be incurred, depending on the exact regulatory requirements for these add-on systems. Qualification costs could be significant; for hydrogen igniters alone it is estimated to be $500,000.
- Operation and maintenance costs were roughly estimated to be $150,000 per year. This was judgmentally split among the systems within an alternative.

F.2.4 Plant-Specific Analyses in Support of the Decay Heat Removal Generic Issue Program

Preliminary estimates of plant impacts, including costs, have been developed in support of the Decay Heat Removal Program (TAP A-45) [5,6]. These cost estimates are for very specific modifications, grouped into alternatives, and then evaluated. Because the modifications are plant-specific and based on a review of accident sequence cut sets, this was one of the most useful sources of information for the the SARRP risk reduction evaluation.

The following characteristics apply to all of the cost information derived from this source:

- The design concepts were developed and supplemented with a site visit to determine plant-specific design requirements that could impact cost.
- The generic costs (rather than the costs adjusted for local labor and materials rates) were used in the data base.
- The estimates were developed with methods similar to those provided in the handbook for nuclear plant cost estimating [7]. The costs incurred by the government in implementing a regulatory requirement were not included.
- Owner's costs were estimated as 10% of the total for the modification. This is intended to include retraining, engineering support, interaction with regulatory agencies, health physics, contract management, and quality assurance activities. It is recognized that this is very dependent on the specific utility. The groundrule employed in this reference was that the entire modification would be contracted out and that the utility would therefore serve a minimal role as contract manager and in roles required by the regulator.
- A 25% contingency was included in the total estimate.
- The reference used an inflation rate of 6%, a discount rate of 10.5%, and a fixed charge rate of 17%. None of these factors are included in the total onetime costs reported in the data base.
- The design and management allocation in the data base includes the costs associated with the contractors efforts, rather than the utility costs which are included in the owner's costs category.

- The category in the data base labeled "other" includes both the 25% contingency, and the temporary construction costs associated with the actual implementation of the modification. This category includes tests and startup costs.
- The generic costs used in the data base are derived from the "Energy Economic Data Base"[8].
- The labor costs from Reference 8 were adjusted to reflect conditions associated with backfit costs.
- The operations and maintenance costs associated with an alternative were divided among the modifications within the alternative based on the qualitative information provided in the report. This was reported as the total recurring costs, based on 1985 dollars. A more accurate representation of the recurring costs would include a levelization factor, but this would be dependent on the individual plant and its remaining life.
- All costs are based on last quarter 1984 dollars.

F.2.5 AIF Working Group

In February of 1980 , a working group was formed under the auspices of the Atomic Industrial Forum (AIF) to estimate the total industry costs associated with the implementation of plant modifications associated with the draft of the post-Three Mile Island NRC Action Plan--NUREG-0660 [9]. The report of this working group included information relevant to the types of modifications included in SARRP [10]. The basic groundrules used in developing their estimates of cost are discussed below.

- The NRC-proposed modifications were defined more specifically and in some cases altered to reflect a more effective change. The brief description in the data base entry includes the basic scope of the modification being considered.
- The costs were estimated on a yearly basis for a schedule developed for each change. These were summed for the total onetime cost reported in the data base.
- Indirect costs, including owner's costs and Allowance for Funds Used During Construction (AFUDC) were also estimated. These were added to the total onetime costs in the data base. This results in a slight difference from most of the other sources of data since factors such as AFUDC were usually excluded. In this case these costs could not be separated from owner's costs. In any case, this indirect cost element is typically less that 10% of the total estimated cost.
- The costs were estimated on an industry-wide basis. The total cost had to be divided by the number of units affected to obtain the per-unit cost.
- The costs are based on the 1980 dollar.

F.2.6 EPRI Value/Impact Study

The Electric Power Research Institute (EPRI) sponsored a study of the value/impact of selected modifications as reported in Reference [11]. Each modification was defined in scope and evaluated using a form that detailed a cost breakdown. The approach used was intended to provide a onetime cost estimate, and did not include inflation, interest and other factors that have been extracted from other sources. The report includes study cost to refine the design concept, as well as the actual costs associated with the specific design activity. Specific owner's costs, including documentation, design review, quality assurance, and licensing approval were also estimated and are reported in the data base under owner's costs. Plant outage time was also estimated, although this is not used directly in the first-cut SARRP analysis of value/impact. The reference also includes a listing of the assumptions associated with each of the specific modifications considered.

F.2.7 Mitigation Systems for Mark II Reactors

A series of reports by R & D Associates summarizes research into options intended to reduce plant risk, principally through mitigation of accidents and limitation of the total containment loading. One of these reports, Reference 12, includes fairly detailed cost estimates. These estimates are included in the cost records and although the options were intended for a specific reactor design, they were only roughly designed and the estimates could therefore apply more broadly. The basic groundrules used in developing the costs are discussed below.

- The options were designed in modules such that some of the records describe pieces of systems that would have to be combined with others to fulfill the design objective.
- Inflation during construction was treated by escalating all costs by 4 %.
- A 25 % contingency is included in all estimates.
- There was no factor to account for this being a nuclear plant project: standard construction cost factors were used.
- The costs are based on the mid-1984 dollar.

In general, a review of the costs from this source indicates that the estimates appear quite low for a number of the larger systems proposed. For example, the system listed in record 39 describes an independent and redundant heat rejection system in its own building. This option is estimated to cost very significantly less than the addition of an independent containment heat removal system or a single train of diesel cooling water (see records 49 and

462

50). Specific line-item comparisons with estimates from other sources also indicate similar differences. Several of the other options involve tunneling under an existing plant's basemat or extensive work in the reactor cavity: options industry spokespersons have refused to even consider based on lack of feasibility. It should be noted that Reference 12 does suggest that there might be feasibility problems with several of the options proposed. Finally, the fact that the costs do not include specific consideration of owner's costs and the cost premium associated with nuclear plant work also appears to be a severe limitation when the details of other estimates that include these costs are compared to those generated in this reference. The cost estimates derived from this source were used very carefully in this study due to these limitations.

F.2.8 Other Cost Data Sources

There are other sources referenced in the specific data listings in Section F.6. In general, other sources were used to obtain cost information on a limited number of modifications, and a detailed understanding of the methodology used is not necessary. The cost data was extracted in a format similar to that used for the other sources, and the individual variation does not represent a major source of uncertainty.

F.3 USE OF THE DATA BASE FOR COST ESTIMATION

Several of the modifications considered are directly comparable to specific entries in the data base. For these modifications, the data in the cost data base was used directly as the central estimate of the cost for the option. For the cases where there was more than one data point that directly applied, engineering judgment was used to select the cost estimate that appeared to be most relevant, most complete, and from the best-documented source.

In many other cases, the modifications proposed for a specific risk reduction option were very plant specific and had not been evaluated in previous studies. These cases required more liberal use of engineering judgment, drawing from as many of the individual data entries as possible. The costs detailed in Section F.6 include estimates of line item costs for all sources that included that information. Thus there was available some cost information for most types of mechanical and electrical modifications that were proposed. There are also some entries in the data base for items such as procedural or staffing changes, or changes in information systems available to the operator.

The use of the data included in this appendix as a source of cost information is detailed in Appendix E. Appendix E references the individual data base entries provided here that were used in the estimates for Surry.

F.4 UNCERTAINTY IN COST ESTIMATION

The individual data entries only include point estimates of costs for the proposed modifications. The value/impact analysis performed for each reference plant includes consideration of the uncertainty associated with each measure of value and impact, although this consideration of uncertainty is not propagated in a rigorous statistical sense. The uncertainty associated with costs of modifications has been evaluated in a manner similar to the other inputs in the study: three values are used to characterize the range of costs that are associated with each option. As stated above, the central estimate was obtained by using appropriate data to obtain a realistic best estimate, or central estimate, for the proposed modification.

The estimates of the upper and lower estimates which represent a reasonable range of costs that might be expected in actual implementation of the option are also included. For well defined options, uncertainties have been generated from the central estimate using a formula provided below.. This was done because it was judged that the variation in costs would be expected to be driven by forces that are not specific to a particular option. Other factors such as regulatory interaction, utility-specific management capabilities and local variation in costs would apply similarly to all options. There is also uncertainty that would be specific to the options, for example, some options might result in costs over the estimate due to lack of room to efficiently place equipment, while other options such as a circuitry change would be less likely to have that type of uncertainty. However, the estimates used in this study are not detailed enough to allow a direct determination of these types of costs, and the overall uncertainty can be estimated using a set of rules that apply to all cost estimates. For options which could not be well defined, the variation in costs includes uncertainty in the scope of the modification that might be required.

Some of the references included cost uncertainty information. The uncertainty information derived from these sources is summarized below. Reference 4 reported an error band on costs of +/- 33%, with no detailed supporting information.

Reference 10, the AIF study, included some uncertainty information in the form of histograms that were used to illustrate probabilities that the total cost fell between certain values. Most of the modifications examined were different from those proposed here and only limited uncertainty information was presented. Three uncertainty ranges that were presented appear to apply to the modifications considered in SARRP:

464

- $ 0.5 M +/- $ 0.2M, with no definition of the confidence interval; a 10% to 90% spread would appear to reasonable;
- $ 5M with a 10%-90% confidence range of $ 3M to $ 11M; and,
- $ 4M with a 95% confidence limit of 8M

This limited information would seem to indicate that a reasonable upper estimate is approximately a factor of two above the central, while a lower estimate would be a factor of two below the central.

The EPRI study [11] included upper and lower estimates for each cost element of each alternative, and these were summed to obtain upper and lower estimates for the alternative as a whole. There were no details given as to the statistical meaning of the estimates, but it would appear that they would be analogous to the upper and lower parameters used in the SARRP program. The uncertainty information from this source is summarized below:

Central	Upper	Lower
$42,000	$60,000	$28,000
$37,000	$51,000	$24,000
$140,000	$180,000	$90,000
$100,000	$140,000	$70,000
$245,000	$360,000	$160,000

As illustrated in the information above, this reference would indicate that the upper estimate is roughly 35% above the central and the lower estimate is about 35% below the central estimate. Note that all of these options had relatively low total costs.

The only other source of information relative to uncertainty in costs is discussed in Reference 6. This source points out the weakness in the uncertainties reported in this section so far--they are not based on a before and after study of actual implementation at a utility. Although the data in Reference 6 is limited, it does appear to confirm conventional wisdom that it is unlikely that a nuclear plant retrofit will cost less than the original estimate and that there have been numerous cases in which the final cost was an order of magnitude or more greater than the original estimate. In many of the cases where the final costs were drastically different from the estimate, other factors, such as regulatory interaction or continuous scope increases relative to the original modification dominated the increase in cost. Nevertheless, it would appear to be unreasonable to expect the modifications proposed in this program to be immune from these typical problems encountered in nuclear plant backfit work. Thus it is believed that

465

the upper estimates should reflect the character of actual backfit work, rather than just the uncertainty in estimating practices.

Engineering judgment based on all of the information presented above was used to develop the following uncertainty information for the cost estimates used in SARRP:

High Estimate--A factor of 2 times the central estimate

Low Estimate--A factor of 0.7 times the central estimate.

This formula was not always used, since some of the options were judged to have particular characteristics which would affect the uncertainty representation. Options which could not be specifically described often included a much wider range of costs to account for both the uncertainty in costs as well as the uncertainty in what might be required to satisfy the objective of the modification. The first prevention option for Grand Gulf, the assurance of seal integrity, is one such option: additional study would be required to determine if physical changes would be required, and it is therefore possible to have the range of costs represent the possibility of additional study expenditure up to major pump seal hardware modification.

In order to clarify the use of uncertainty for the cost estimates, the parameters used are defined below:

- The central estimate is a best estimate of cost based on standard estimating practices
- The lower estimate reflects the variability in estimating techniques and the uncertainty associated with the use of the data in Section F.7 to represent different types of modifications.
- The upper estimate reflects the uncertainty in estimating as well as the observation that a large history of nuclear plant backfit experience has shown that there have been large cost overruns associated with many backfit projects. As with the lower and central, the upper estimate does not include consideration of the either the replacement power costs or the interest charges that could accrue for modifications that were delayed or resulted in large plant downtime. The upper estimate is also intended to be concerned with the modification as defined, and not as altered to incorporate additional changes in scope.

As noted previously, the value/impact analysis is first carried out assuming that the project could be scheduled to avoid any downtime associated with the modification. It is known that this is optimistic for some of the large options, or those that involve significant containment work. A more accurate assessment of total cost was performed for all cases in which the range associated with the onetime estimate excluding replacement power and interest charges indicated a potentially beneficial status for the modification.

F.5 RADIATION EXPOSURE ESTIMATION

An accurate estimation of worker radiation exposure associated with each option is difficult without more specific planning of the proposed changes. The exposure is dependent on the nature of the modification, the location of the work within the individual plant, the scheduling of the entire job in terms of crew size and personnel availability, shielding measures taken during the construction phase and many other factors. Some of the references used for cost information did include estimates of radiation exposure. The insights derived from these sources are summarized in Table F-1.

As indicated in the table, there is limited data available, and the data that is available varies widely. This would be expected since the radiation exposure associated with the implementation of modifications would be expected to be entirely plant specific. In addition, the dose that the workers receive is determined by the actual day-to-day working environment, and probably cannot be estimated without detailed planning of the construction activity.

Radiation doses were estimated for the SARRP analysis based primarily on engineering judgment. A best estimate was used in the calculation because the uncertainty in the radiation dose was insignificant compared to the other costs of the options. It should be noted that the costs associated with the impact of a radiation environment on task planning and performance were included in several of the cost estimates in the data base.

F.6 COST DATA BASE

The data from the various sources is summarized on the pages that follow. Table F-2 provides a summary of the more detailed data records that follow. Because this information is stored in a computerized data base for efficient retrieval and updating, each entry has the same format. Each data field was filled as completely as possible based on the information in the reference. The proposed modifications are divided into preventative options (those intended to reduce core melt frequency) and mitigative (those that reduce the consequences of an accident). These groupings are not always unique, particularly for the BWRs, since some options perform both functions. The comments on the data entries provide additional detail that can be used with the groundrules in Section F.2. The value reported as "Total Onetime Cost" includes all the onetime costs irrespective of interest and replacement power costs. As described earlier, these two items depend on the individual circumstances at the time of the modification and are not included in the first-cut cost estimate.

467

Table F-1
RADIATION EXPOSURE BASE FOR PLANT MODIFICATIONS

Modification	Radiation Dose (Person-Rems)	
Add-on Containment Spray & Recirculation	360	PWR
	180	Ice Condenser
	100	BWR
Add-on Spray System, No Recirculation	150	PWR
	100	BWR
Addition of a Hydrogen Igniter System	560	PWR
	620	Ice Condenser
	450	BWR
Backup Air Pressure for PORVs	14	
Closed-Loop Containment Cooling System	195	PWR
	150	Ice Condenser
	120	BWR
Independent Decay Heat Removal System [5]	486	
Independent Decay Heat Removal System [6]	1200	
Redundant RHR Pump Cooler Outlet Valve	17	

468

Table F-2
SUMMARY OF COST DATA BASE

Modification	Type	Onetime Cost	Recurring Costs
1. RWST Level Alarm Improvements	Prev.	$29,000	
2. Automate ADS Function	Prev.	$32,000	
3. Isolation Condenser Isolation Logic	Mit.	$35,300	
4. Auto Isolation of Isolation Condenser	Mit.	$36,480	
5. Install HPCI Time Delay	Prev.	$36,620	
6. Redundant RHR Pump Cooler Outlet Valve	Prev.	$38,000	
7. Install Diesel-Driven Service Water Pump	Prev.	$38,800	
8. Separation of RCIC/HPCI Actuation Levels	Prev.	$42,000	
9. Modify RCIC for Auto Restart	Prev.	$50,300	
10. Automatic Closure of PORV Block Valves	Prev.	$80,000	
11. Install Auto Restart of Injection Systems	Prev.	$81,060	
12. Diesel Intake/Exhaust Modification (106)	Prev.	$84,000	
13. AFW Reliability Study	Prev.	$100,000	
14. Connect Isolation Condenser Vent to Stack	Mit.	$135,000	
15. Wall Separating Service Water Pumps (109)	Prev.	$184,000	
16. Install New Service Water Train	Prev.	$246,000	
17. Backup Air Pressure for PORVs (508)	Prev.	$285,000	$3,000
18. Install Auto Transfer for ECCS Dc Bus (304)	Prev.	$330,000	$2,000
19. Electrical Equipment Seismic Anchorage (107)	Prev.	$334,800	
20. New Radiation Monitors	Mit.	$345,000	$10,000
21. Dedicated Battery for Diesel Starting (302)	Prev.	$361,000	$1,000
22. Add a Reactor Operator	Prev	$438,000	
23. Automatic Venting System	Mit	$480,000	
24. New Drywell Spray System, Internal	Mit.	$515,000	
25. Increase Control Room Staff	Prev.	$600,000	
26. Connection of New Cooling to AFW pump	Prev.	$771,000	$8,000
27. Dedicated Diesel Generator Batteries (302)	Prev.	$786,000	$7,000
28. New Drywell Spray System, External	Mit.	$860,000	
29. Containment Vent Line	Mit.	$1,000,000	
30 Fire Detectors and Suppression Equipment	Prev.	$1,052,000	$6,500
31. Station Backup Batteries	Prev.	$1,180,000	$6,500

Table F-2 (Continued)

Modification	Type	Onetime Cost	Recurring Costs
32. Separation of Dc Power Supplies (311)	Prev.	$1,287,000	
33. Improvement of Aux Building Ventilation	Mit.	$1,700,000	$10,000
34. Plant Stack Vent Anchorage (107)	Prev.	$1,714,000	
35. Containment Pressure Relief	Prev.	$1,728,000	
36. AFW Pump Room Fire Protection (810)	Prev.	$1,882,000	$7,000
37. Radiological Monitoring of Effluents	Mit.	$2,300,000	$35,000
38. Gas Combustor System	Mit.	$2,600,000	
39. Independent Containment Heat Removal	Prev/Mit	$2,770,000	
40. Low-Flow Vent Filter	Mit	$2,785,000	
41. Core Redistribution System	Mit	$3,330,000	
42. Core Retention and Cooling System	Mit	$3,445,000	
43. Addition of Two Hydrogen Recombiners	Mit	$3,572,000	
44. Add-on Spray System, No Recirculation	Mit.	$3,680,000	$50,000
45. Safety Parameter Display System	Prev.	$4,100,000	$25,000
46. High-Flow Vent Filter	Mit	$4,242,000	
47. Injection Suction Line From Fuel Pool (806)	Prev.	$4,870,000	$1,000
48. Safety System Status Monitor	Prev.	$6,000,000	$50,000
49. New Diesel Cooling Water Pump (803)	Prev.	$6,111,000	$6,000
50. Closed-Loop Containment Cooling System	Mit.	$7,360,000	$80,000
51. Addition of Hydrogen Igniter System	Mit.	$7,580,000	$50,000
52. Add-on Containment Spray & Recirculation	Mit.	$9,130,000	$100,000
53. Filtered-Vent System	Mit.	$13,000,000	
54. Containment Vent and Filter	Mit.	$14,000,000	
55. Addition of a Fourth Diesel Generator (301)	Prev.	$16,000,000	$200,000
56. Add-on LPI and Suppression Pool Cooling	Prev.	$20,300,000	
57. Dry Crucible, Cooled Core Catcher	Mit	$20,500,000	
58. Add-on HPI for Feed and Bleed	Prev.	$26,800,000	
59. Add-on AFW and Primary Makeup	Prev.	$29,200,000	
60. High Efficiency Containment Vent & Filter	Mit.	$33,000,000	
61. Independent Decay Heat Removal System	Prev.	$61,000,000	$585,000
62. Independent Decay Heat Removal System	Prev.	$65,000,000	$620,000
63. Independent DHR System (813)	Prev.	$77,550,000	$845,000

1

Modification: RWST Level Alarm Improvements **Type:** Prev.

Description: Improvement of existing alarm by changing annunciator color and interlocking with valve positions to reflash at timed intervals. The existing level sensors would be utilized.

Total Onetime Cost	$29,000
Labor:	$27,000
Materials:	$2,000
Design and Mgt:	
Owner's Costs:	
Other:	

Interest:

Downtime Costs:

Total Recurring Costs:

Line Item Costs: **Labor:** **Materials:**

Comments: Other associated costs are minimal.

Reference: "Plant Impact Assessment Report for Trojan Nuclear Power Plant: Decay Heat Removal Alternatives" (PIAR-4). Tables 4..1-1,2. (Unpublished)

Date: June 1, 1985 **Source:** SNL/United Engrs. & Constructors

2

Modification: Automate ADS Function **Type:** Prev.

Description: Install automatic ADS logic so that ADS actuates when all of the following are satisfied: no high pressure flow, low RCS level, low pressure system operating, 120 second timer times out.

Total Onetime Cost	$32,000
Labor:	$1,760
Materials:	$1,000
Design and Mgt:	$6,000
Owner's Costs:	$16,400
Other:	$6,800

Interest:

Downtime Costs:

Total Recurring Costs:

Line Item Costs: **Labor:** **Materials:**

Comments: 1. These costs seem very low for a change that could have many safety implications. Use this record with caution.

Reference: "Value-Impact Analysis of Selected Safety Modifications to Nuclear Power Plants" EPRI NP-3434. R. Fullwood, Science Applications International Corporation. Pg C.3-11

Date: March 1, 1984 **Source:** EPRI/SAIC

3

Modification: Isolation Condenser Isolation Logic **Type:** Mit.

Description: Installation of an automatic system to perform the actions required of the operator on a high radiation signal in the condenser vent: isolate one bundle, wait a time delay and test for dropping radiation level, isolate the other if no, isolate both if radiation does not drop.

Total Onetime Cost	$35,300
Labor:	$1,300
Materials:	$5,000
Design and Mgt:	$25,000
Owner's Costs:	$2,000
Other:	$2,000

Interest:

Downtime Costs:

Total Recurring Costs:

Line Item Costs: **Labor:** **Materials:**

Comments:

1. The study says there is no licensing cost since this just automates an intended function, but it seems that there could be need for safety review with potential for licensing implications due to the nature of this fix.

Reference: "Value-Impact Analysis of Selected Safety Modifications to Nuclear Power Plants" EPRI NP-3434. R. Fullwood, Science Applications International Corporation. Pg C.2-19

Date: March 1, 1984 **Source:** EPRI/SAIC

4

Modification: Auto Isolation of Isolation Condenser **Type:** Mit.

Description: Installation of radiation detectors in the condenser vent that will automatically isolate the condenser on a high radiation signal.

Total Onetime Cost	$36,480
Labor:	$880
Materials:	$400
Design and Mgt:	$30,800
Owner's Costs:	$2,000
Other:	$2,400

Interest:

Downtime Costs:

Total Recurring Costs:

Line Item Costs: **Labor:** **Materials:**

Comments:

Reference: "Value-Impact Analysis of Selected Safety Modifications to Nuclear Power Plants" EPRI NP-3434. R. Fullwood, Science Applications International Corporation. Pg C.2-4

Date: March 1, 1985 **Source:** EPRI/SAIC

479

5

Modification: Install HPCI Time Delay **Type:** Prev.

Description: Installation of a time delay to allow RCIC to recover level before the initiation of HPCI.

Total Onetime Cost	$36,620
Labor:	$220
Materials:	$200
Design and Mgt:	$15,800
Owner's Costs:	$14,000
Other:	$6,400

Interest:

Downtime Costs:

Total Recurring Costs:

Line Item Costs:	**Labor:**	**Materials:**

Comments:

Reference: "Value-Impact Analysis of Selected Safety Modifications to Nuclear Power Plants" EPRI NP-3434. R. Fullwood, Science Applications International Corporation. Pg C.1-24

Date: March 1, 1984 **Source:** EPRI/SAIC

6

Modification: Redundant RHR Pump Cooler Outlet Valve **Type:** Prev.

Description: The single 2" discharge from the RHR pump coolers is divided into two lines and two discharge valves to limit the impact of potential valve blockage.

Total Onetime Cost	$38,000
Labor:	$14,000
Materials:	$2,000
Design and Mgt:	$4,000
Owner's Costs:	$3,000
Other:	$15,000

Interest:

Downtime Costs:

Total Recurring Costs:

Line Item Costs:	**Labor:**	**Materials:**
Manual Valve, 2", and some piping	$14,000	$2,000

Comments:

Reference: "Plant Impact Assessment Report for Point Beach NPP: Decay Heat Removal Alternatives" (PIAR-1). Tables 4..3-1,2. (See Appendix J of NUREG/CR-4458.)

Date: June 1, 1985 **Source:** SNL/United Engrs. & Constructors

7

Modification: Install Diesel-Driven Service Water Pump **Type:** Prev.

Description: Install a diesel-driven service water pump for plant, and particularly pump seal cooling during loss of power conditions. Put in parallel with the existing pump.

Total Onetime Cost	$38,800
Labor:	$9,200
Materials:	$18,000
Design and Mgt:	$2,000
Owner's Costs:	$2,400
Other:	$5,200

Interest:

Downtime Costs:

Total Recurring Costs:

Line Item Costs: **Labor:** **Materials:**

Comments: 1. These costs seem very low.

Reference: "Value-Impact Analysis of Selected Safety Modifications to Nuclear Power Plants" EPRI NP-3434. R. Fullwood, Science Applications International Corporation. Pg C.4-11

Date: March 1, 1984 **Source:** EPRI/SAIC

8

Modification: Separation of RCIC/HPCI Actuation Levels **Type:** Prev.

Description: The plant under consideration has one actuation level for RCIC and HPCI. The modification would involve raising the RCIC injection level to limit the number of unwanted demands on the HPCI system.

Total Onetime Cost	$42,000
Labor:	$3,520
Materials:	$600
Design and Mgt:	$21,000
Owner's Costs:	$16,000
Other:	$800

Interest:

Downtime Costs:

Total Recurring Costs:

Line Item Costs: **Labor:** **Materials:**

Comments:

Reference: "Value-Impact Analysis of Selected Safety Modifications to Nuclear Power Plants" EPRI NP-3434. R. Fullwood, Science Applications International Corporation. Pg C.1-5

Date: March 1, 1984 **Source:** EPRI/SAIC

474

9

Modification: Modify RCIC for auto restart **Type:** Prev.

Description: Change the RCIC logic so that it automatically restarts at level 2 after a trip at level 8.

Total Onetime Cost	$50,300		
Labor:	$22,000		
Materials:	$7,000	**Interest:**	
Design and Mgt:	$4,500	**Downtime Costs:**	
Owner's Costs:	$16,000	**Total Recurring Costs:**	
Other:	$800		

Line Item Costs: **Labor:** **Materials:**

Comments:

Reference: "Value-Impact Analysis of Selected Safety Modifications to Nuclear Power Plants" EPRI NP-3434. R. Fullwood, Science Applications International Corporation. Pg C.1-15

Date: March 1, 1984 **Source:** EPRI/SAIC

10

Modification: Automatic Closure of PORV Block Valves **Type:** Prev.

Description: Installation of circuit to automatically isolate the PORV block valve on low RCS pressure.

Total Onetime Cost	$80,000		
Labor:			
Materials:		**Interest:**	
Design and Mgt:		**Downtime Costs:**	
Owner's Costs:		**Total Recurring Costs:**	
Other:			

Line Item Costs: **Labor:** **Materials:**

Comments:

1. This was not looked at in great detail because it was believed to have a significant negative safety impact.
2. This would probably be for two block valves.

Reference: "Report to the AIF Policy Committee on Follow Up to the TMI Accident by the Working Group on Action Plan Priorities and Resources." Letter to Harold Denton from the Atomic Industrial Forum. February 22,1980.

Date: February 22, 1980 **Source:** Industry Working Group

11

Modification: Install Auto Restart of Injection Systems **Type:** Prev.

Description: Install logic so that the core spray and low pressure injection restart each time a low level is reached. Also perform study to determine all safety implications of the change.

Total Onetime Cost	$81,060
Labor:	$1,760
Materials:	$500
Design and Mgt:	$54,000
Owner's Costs:	$24,000
Other:	$800

Interest:

Downtime Costs:

Total Recurring Costs:

Line Item Costs:	Labor:	Materials:

Comments:

Reference: "Value-Impact Analysis of Selected Safety Modifications to Nuclear Power Plants" EPRI NP-3434. R. Fullwood, Science Applications International Corporation. Pg C.5-4

Date: March 1, 1984 **Source:** EPRI/SAIC

12

Modification: Diesel intake/exhaust modification (106) **Type:** Prev.

Description: The intake port, exhaust port and silencer are not designed for tornado wind loading. The changes consist of new anchors (guy wires, steel strap) and removal of some of the exhaust piping.

Total Onetime Cost	$84,000
Labor:	$37,000
Materials:	$3,000
Design and Mgt:	$3,000
Owner's Costs:	$6,000
Other:	$35,000

Interest:

Downtime Costs:

Total Recurring Costs:

Line Item Costs:	Labor:	Materials:
1400 lbs of steel, bolts	$37,000	$3,000

Comments:

Reference: "Plant Impact Assessment Report for Quad Cities NPP: Decay Heat Removal Alternatives" (PIAR-2). Tables 4.3-1,2. (See Appendix J of NUREG/CR-4448.)

Date: June 1, 1985 **Source:** SNL/United Engrs. & Constructors

13

Modification: Aux Feed Reliability Study **Type:** Prev.

Description: Perform qualitative reliability analysis, a deterministic review, and a re-evaluation of system flow and design characteristics.

Total Onetime Cost	$100,000		
Labor:		**Interest:**	
Materials:		**Downtime Costs:**	
Design and Mgt:			
Owner's Costs:	$10,000	**Total Recurring Costs:**	
Other:			

Line Item Costs: **Labor:** **Materials:**

Comments:

Reference: "Report to the AIF Policy Committee on Follow Up to the TMI Accident by the Working Group on Action Plan Priorities and Resources." Letter to Harold Denton from the Atomic Industrial Forum. February 22,1980.

Date: February 22, 1980 **Source:** Industry Working Group

14

Modification: Connect Isolation Condenser Vent to Stack **Type:** Mit.

Description: Re-plumb the isolation condenser vent to the stack through the standby gas treatment facility. A new charcoal bed is included as is a spray for condensing steam. The system will auto initiate on high radiation in the vent.

Total Onetime Cost	$135,000		
Labor:	$9,200	**Interest:**	
Materials:	$25,500	**Downtime Costs:**	
Design and Mgt:	$80,000		
Owner's Costs:	$13,300	**Total Recurring Costs:**	
Other:	$7,000		

Line Item Costs: **Labor:** **Materials:**

Comments:

Reference: "Value-Impact Analysis of Selected Safety Modifications to Nuclear Power Plants" EPRI NP-3434. R. Fullwood, Science Applications International Corporation. Pg C.2-12

Date: March 1, 1984 **Source:** EPRI/SAIC

15

Modification: Wall Separating Service Water Pumps (109) **Type:** Prev.

Description: Erection of a shield wall between the 6 service water pumps (3 on a side) such that a break in the overhead fire header cannot fail all pumps. The wall is structural steel with fire proof panel (3 hour wall rating). There are three penetrations. Wall is 24' x 21'.

Total Onetime Cost	$184,000
Labor:	$72,000
Materials:	$22,000
Design and Mgt:	$5,000
Owner's Costs:	$30,000
Other:	$55,000

Interest:

Downtime Costs:

Total Recurring Costs:

Line Item Costs:	**Labor:**	**Materials:**
12,600 lbs structural steel and 1000 sqft of metal siding		$22,000

Comments: 1. The costs (other than labor and materials) were estimated. and there is some overlap within Alternative 1 since the mod totals come to slightly more than the totals for the whole alternative. This is not a major impact.

Reference: "Plant Impact Assessment Report for Point Beach NPP: Decay Heat Removal Alternatives" (PIAR-1). Tables 4..1-1,2. (See Appendix J of NUREG/CR-4458.)

Date: June 1, 1985 **Source:** SNL/United Engrs. & Constructors

16

Modification: Install New Service Water Train **Type:** Prev.

Description: Install a new train of service water, no technical details given.

Total Onetime Cost	$246,000
Labor:	$100,000
Materials:	$50,000
Design and Mgt:	$50,000
Owner's Costs:	$32,000
Other:	$14,300

Interest:

Downtime Costs:

Total Recurring Costs:

Line Item Costs:	**Labor:**	**Materials:**

Comments: 1. This is for a small plant, Big Rock Point.

Reference: "Value-Impact Analysis of Selected Safety Modifications to Nuclear Power Plants" EPRI NP-3434. R. Fullwood, Science Applications International Corporation. Pg C.4-4

Date: March 1, 1984 **Source:** EPRI/SAIC

478

17

Modification: Backup Air Pressure for PORVs (508) **Type:** Prev.

Description: The addition of safety grade Nitrogen bottles and lines and valving to the PORVs to act as a backup for the instrument air system. Includes 2 bottles, 2 pressure control valves, 2 regulators and 2 solenoid valves.

Total Onetime Cost	$285,000
Labor:	$88,000
Materials:	$45,000
Design and Mgt:	$10,800
Owner's Costs:	$21,000
Other:	$121,000

Interest:

Downtime Costs:

Total Recurring Costs: $3,000

Line Item Costs: **Labor:** **Materials:**

Comments:

1. 5 % of the contingency, construction and design from alternative 1 in PIAR-1 was assigned to this modification.
2. This alternative involves containment entry for installation and for periodic O&M.

Reference: "Plant Impact Assessment Report for Point Beach NPP: Decay Heat Removal Alternatives" (PIAR-1). Tables 4..1-1,2. (See Appendix J of NUREG/CR-4458.)

Date: June 1, 1985 **Source:** SNL/United Engrs. & Constructors

18

Modification: Install Auto Transfer for ECCS Dc Bus (304) **Type:** Prev.

Description: Arrangement to allow auto transfer of 125 v dc bus on loss of power. This involves the addition of 6 transfer switches: in the RHR and core spray system control circuits, and for the 4 kv switchgear control panel.

Total Onetime Cost	$330,000
Labor:	$203,000
Materials:	$21,000
Design and Mgt:	$6,000
Owner's Costs:	$30,000
Other:	$70,000

Interest:

Downtime Costs:

Total Recurring Costs: $2,000

Line Item Costs: **Labor:** **Materials:**

Comments:

1. All items except labor and materials are estimated, and there is some slight doublecounting with Mod 301, but the overestimate on 301 is insignificant.
2. The labor costs appear to be very high.

Reference: "Plant Impact Assessment Report for Quad Cities NPP: Decay Heat Removal Alternatives" (PIAR-2). Tables 4.1-1,2. (See Appendix J of NUREG/CR-4448.)

Date: June 1, 1985 **Source:** SNL/United Engrs. & Constructors

19

Modification: Electrical Equipment Seismic Anchorage (107) **Type:** Prev.

Description: Addition of seismic anchors for 4160 buses, 480 v transformers and buses, instrumentation, inverters, chargers, and new battery racks.

Total Onetime Cost	$334,800
Labor:	$163,000
Materials:	$19,000
Design and Mgt:	$10,800
Owner's Costs:	$21,000
Other:	$121,000

Interest:

Downtime Costs:

Total Recurring Costs:

Line Item Costs:	**Labor:**	**Materials:**
Steel and welding supplies		$19,000

Comments:
1. Based on review of all mods in Alternative 1 in PIAR-1, 5% of other costs were charged to this mod.
2. There would be little or no O&M after mod was complete.

Reference: "Plant Impact Assessment Report for Point Beach NPP: Decay Heat Removal Alternatives" (PIAR-1). Tables 4..1-1,2. (See Appendix J of NUREG/CR-4458.)

Date: June 1, 1985 **Source:** SNL/United Engrs. & Constructors

20

Modification: New Radiation Monitors **Type:** Mit.

Description: Addition of 10 new radiation monitors and evaluation costs associated with their placement.

Total Onetime Cost	$345,000
Labor:	
Materials:	
Design and Mgt:	
Owner's Costs:	$45,000
Other:	

Interest:

Downtime Costs:

Total Recurring Costs: $10,000

Line Item Costs:	**Labor:**	**Materials:**
Wide range radiation monitor	$10,000	$10,000
Assoc. engineering, 10 monitors	$100,000	

Comments:

Reference: "Report to the AIF Policy Committee on Follow Up to the TMI Accident by the Working Group on Action Plan Priorities and Resources." Letter to Harold Denton from the Atomic Industrial Forum. February 22,1980.

Date: February 22, 1980 **Source:** Industry Working Group

480

21 **Modification:** Dedicated Battery for Diesel Starting (302) **Type:** Prev.

Description: A new battery, charger, and a distribution panel to separate the diesel from the bus needed for control of the ECCS.

Total Onetime Cost	$361,000
Labor:	$210,000
Materials:	$50,000
Design and Mgt:	$26,000
Owner's Costs:	$47,000
Other:	$28,000

Interest:

Downtime Costs:

Total Recurring Costs: $1,000

Line Item Costs:	**Labor:**	**Materials:**
Battery, charger, panel		$50,000

Comments:

Reference: "Plant Impact Assessment Report for Quad Cities NPP: Decay Heat Removal Alternatives" (PIAR-2). Tables 4.2-1,2. (See Appendix J of NUREG/CR-4448.)

Date: June 1, 1985 **Source:** SNL/United Engrs. & Constructors

22 **Modification:** Add a reactor operator **Type:** Prev

Description: Change the requirements and add staff to ensure that there are two operators in the control room at all times

Total Onetime Cost	$438,000
Labor:	$438,000
Materials:	
Design and Mgt:	
Owner's Costs:	
Other:	

Interest:

Downtime Costs:

Total Recurring Costs:

Line Item Costs: **Labor:** **Materials:**

Comments: 1. Labor includes all training and retraining costs for three new operators.

Reference: "Value-Impact Analysis of Selected Safety Modifications to Nuclear Power Plants" EPRI NP-3434. R. Fullwood, Science Applications International Corporation. Pg C.6-4

Date: March 1, 1984 **Source:** EPRI/SAIC

23

Modification: Automatic Venting System **Type:** Mit.

Description: Additional valving and piping added to the reactor building ventilation to allow large (800 SCFM) purge rates on demand. An automatic actuation circuit is included.

Total Onetime Cost	$480,000		
Labor:	$45,000	**Interest:**	
Materials:	$275,000	**Downtime Costs:**	
Design and Mgt:	$100,000		
Owner's Costs:		**Total Recurring Costs:**	
Other:			

Line Item Costs:	**Labor:**	**Materials:**
1. Valve (16" AOV,150#)	$2,550	$11,000
2. Flow controller	$100	$1,600
3. Control panel and controls		$20,000
4. Check valve (12", 150#)	$500	$9,000

Comments:
1. Costs appear to be very rough, and do not seem to consider backfit problems and general problems with nuclear installation (e.g. security, radiation, etc.)
2. Regulatory costs are also not included.

Reference: "Conceptual Design of a Core Melt Mitigation System for a PWR with an Ice Condenser Containment" EGG-PR-5633. H. J. Reilly, et. al., USDOE. Appendix F

Date: February 1, 1985 **Source:** EG&G Idaho

24

Modification: New Drywell Spray System, Located in Drywell **Type:** Mit/prev

Description: Four pipes deliver cooled water to the different levels of the drywell through multiple spray headers. This option must be used in conjunction with an external cooling system such as that described in Record 55 (actually a varient of record 55 that is designed with equipment located directly below the basemat).

Total Onetime Cost	$515,000		
Labor:	$155,000	**Interest:**	
Materials:	$60,000	**Downtime Costs:**	
Design and Mgt:	$200,000		
Owner's Costs:		**Total Recurring Costs:**	
Other:	$100,000		

Line Item Costs:	**Labor:**	**Materials:**
Radiation protection costs		$50,000

Comments:
1. This system will must be used with a pumping/cooling system as in Record 55.
2. These costs are for an operating plant.
3. It is not clear that owners' costs and other indirect costs were given detailed consideration and the total costs could therefore be low.

Reference: Mitigation Systems for Mark II Reactors", Dooley, J. L., et al. R & D Associates, Marina del Ray, CA: May 1984--preliminary report. Table A-3

Date: May 1, 1984 **Source:** R & D Associates

482

EST COPY AVAILA

25

Modification: Increase Control Room Staff **Type:** Prev.

Description: Require an SRO and RO in the control room at all times. It was assumed that the SRO would be an existing RO, requalified as an SRO.

Total Onetime Cost	$500,000		
Labor:		**Interest:**	
Materials:		**Downtime Costs:**	
Design and Mgt:			
Owner's Costs:	$79,000	**Total Recurring Costs:**	
Other:			

Line Item Costs: **Labor:** **Materials:**

Comments: 1. The uncertainty is estimated to be $200,000.

Reference: "Report to the AIF Policy Committee on Follow Up to the TMI Accident by the Working Group on Action Plan Priorities and Resources." Letter to Harold Denton from the Atomic Industrial Forum. February 22,1980.

Date: February 22, 1980 **Source:** Industry Working Group

26

Modification: Connection of New Cooling to AFW pump **Type:** Prev.

Description: This modification includes the addition of a new line from the intermediate stage of the pump to cool the pump, and a new line through the diesel heat exchanger from the pump discharge to allow for sell cooling of the diesel. A new jacket water cooler is also included.

Total Onetime Cost	$771,000		
Labor:	$236,000	**Interest:**	
Materials:	$121,000	**Downtime Costs:**	
Design and Mgt:	$14,000		
Owner's Costs:	$57,000	**Total Recurring Costs:**	$8,000
Other:	$343,000		

Line Item Costs: **Labor:** **Materials:**

Comments:

Reference: "Plant Impact Assessment Report for Trojan Nuclear Power Plant: Decay Heat Removal Alternatives" (PIAR-4). Tables 4..2-1,2. (Unpublished)

Date: June 1, 1985 **Source:** SNL/United Engrs. & Constructors

483

27

Modification: Dedicated Diesel Generator Batteries (302) **Type:** Prev.

Description: Addition of two 125 Vdc batteries (59 cells), 43 amp-hours, to act as a dedicated starting unit (field flashing) and for control power when other sources are unavailable. Two new chargers and distribution panels are also included.

Total Onetime Cost	$786,000
Labor:	$366,000
Materials:	$57,000
Design and Mgt:	$9,000
Owner's Costs:	$50,000
Other:	$124,000

Interest:

Downtime Costs:

Total Recurring Costs: $7,000

Line Item Costs:	**Labor:**	**Materials:**

Comments:
1. Note the low materials costs compared to other battery modifications.

Reference: "Plant Impact Assessment Report for Point Beach NPP: Decay Heat Removal Alternatives" (PIAR-1). Tables 4.2-1,2. (See Appendix J of NUREG/CR-4458.)

Date: June 1, 1985 **Source:** SNL/United Engrs. & Constructors

28

Modification: New Drywell Spray System, External to Drywell **Type:** Mit/prev

Description: Two circular headers outside containment are supplied with cool water by the independent heat removal system described in Record 55. These main headers each have six spray headers which penetrate the drywell. Two check valves are included on each penetration line.

Total Onetime Cost	$860,000
Labor:	$197,000
Materials:	$259,000
Design and Mgt:	$232,000
Owner's Costs:	
Other:	$172,000

Interest:

Downtime Costs:

Total Recurring Costs:

Line Item Costs:	**Labor:**	**Materials:**
Small, 2 inch drywell penetration		$6,000
One 12 " header around drywell		$25,000

Comments:
1. This system must be used with a pumping/cooling system as in Record 55.
2. These costs are for an operating plant.
3. It is not clear that owners' costs and other indirect costs were given detailed consideration and the total costs could therefore be low.

Reference: Mitigation Systems for Mark II Reactors", Dooley, J. L., et al. R & D Associates, Marina del Ray, CA: May 1984--preliminary report. Table A-3

Date: May 1, 1984 **Source:** R & D Associates

29

Modification: Containment Vent Line **Type:** Mit.

Description: Installation of lines and valves to allow containment venting through the turbine building roof. No filter included. Auto initiation by relief valves.

Total Onetime Cost $1,000,000

Labor: $200,000
Materials: $800,000
Design and Mgt:
Owner's Costs:
Other:

Interest:
Downtime Costs: $5,000,000
Total Recurring Costs:

Line Item Costs:	**Labor:**	**Materials:**
1. Valve (36" AOV, 150#)	$360	$53,000

Comments:
1. This system uses existing lines, simply adding the potential for automatic purge on demand.
2. These are based on 1980 dollars.
3. Line item two was actually found in the report of record 3.

Reference: "Filtered-Vented Containment Systems Conceptual Designs for a Mark I Containment Boiling Water Reactor" A. L. Carter, Holmes and Narver, Inc., Letter Report to A. S. Benjamin, Sandia National Laboratories.

Date: January 13, 1982 **Source:** Sandia/Holmes and Narver

30

Modification: Fire Detectors and Suppression Equipment **Type:** Prev.

Description: The addition of 15 new temperature detectors which automatically initiate 3 new deluge valves that will be connected to new branches off the existing deluge system. A local control panel is also included.

Total Onetime Cost $1,052,000

Labor: $401,000
Materials: $30,000
Design and Mgt: $37,000
Owner's Costs: $84,000
Other: $500,000

Interest:
Downtime Costs:
Total Recurring Costs: $6,500

Line Item Costs:	**Labor:**	**Materials:**

Comments:
1. Based on a review of Alternative 1 in PIAR-4, the non-direct costs were divided equally between Mod 302 and Mod 807.

Reference: "Plant Impact Assessment Report for Trojan Nuclear Power Plant: Decay Heat Removal Alternatives" (PIAR-4). Tables 4..1-1,2 (Unpublished)

Date: June 1, 1985 **Source:** SNL/United Engrs. & Constructors

485

31

Modification: Station Backup Batteries **Type:** Prev.

Description: Backup batteries for the two principal dc buses. 125 volt, 36 cells, and 10,000 amp-hours. Safety grade. Manual transfer switch.

Total Onetime Cost	$1,180,000
Labor:	$152,000
Materials:	$407,000
Design and Mgt:	$37,000
Owner's Costs:	$84,000
Other:	$500,000

Interest:

Downtime Costs:

Total Recurring Costs: $6,500

Line Item Costs:	**Labor:**	**Materials:**

Comments:
1. Based on a review of Alternative 1 in PIAR-4, the non-direct costs were divided equally between Mod 302 and Mod 807.
2. The design category is basically management for this case.

Reference: "Plant Impact Assessment Report for Trojan Nuclear Power Plant: Decay Heat Removal Alternatives" (PIAR-4). Tables 4..1-1,2 (Unpublished)

Date: June 1, 1985 **Source:** SNL/United Engrs. & Constructors

32

Modification: Separation of Dc Power Supplies (311) **Type:** Prev.

Description: Two trains of electric power will be separated by moving a battery charger and distribution panel from the 4160 v switchgear room to an adjacent room 50 feet away.

Total Onetime Cost	$1,287,000
Labor:	$552,000
Materials:	$27,000
Design and Mgt:	$122,000
Owner's Costs:	$97,000
Other:	$519,000

Interest:

Downtime Costs:

Total Recurring Costs:

Line Item Costs:	**Labor:**	**Materials:**
1000 ft of conduit and cable and support, one new fuse		$27,000

Comments:
1. This would involve overtime.
2. The labor costs appear to be high.

Reference: "Plant Impact Assessment Report for Point Beach NPP: Decay Heat Removal Alternatives" (PIAR-1). Tables 4.3-1,2. (See Appendix J of NUREG/CR-4458.)

Date: June 1, 1985 **Source:** SNL/United Engrs. & Constructors

486

33

Modification: Improvement of Aux Building Ventilation **Type:** Mit.

Description: Analysis of potential leak paths from the auxiliary building and backfit of a 50,000-100,000 cfm charcoal adsorption system.

Total Onetime Cost $1,700,000

Labor:
Materials:
Design and Mgt:
Owner's Costs: $250,000
Other:

Interest:
Downtime Costs:
Total Recurring Costs: $10,000

Line Item Costs: **Labor:** **Materials:**

Comments: 1. The total industry figure was divided by 65 to account for the 80% of PWRs that would require backfit.

Reference: "Report to the AIF Policy Committee on Follow Up to the TMI Accident by the Working Group on Action Plan Priorities and Resources." Letter to Harold Denton from the Atomic Industrial Forum. February 22,1980.

Date: February 22, 1980 **Source:** Industry Working Group

34

Modification: Plant Stack Vent Anchorage (107) **Type:** Prev.

Description: The plant's 310' stack is not designed for tornado or seismic loads and this modification involves the addition of guy wires to prevent the stack from falling on important equipment (turbine building).

Total Onetime Cost $1,714,000

Labor: $578,000
Materials: $237,000
Design and Mgt: $58,000
Owner's Costs: $111,000
Other: $730,000

Interest:
Downtime Costs:
Total Recurring Costs:

Line Item Costs:	**Labor:**	**Materials:**
1500' steel cable, 13000# steel, rebar, concrete, excavation	$578,000	$237,000

Comments: 1. This appears to equal the cost of a new stack in the vent filter option.

Reference: "Plant Impact Assessment Report for Quad Cities NPP: Decay Heat Removal Alternatives" (PIAR-2). Tables 4.3-1,2. (See Appendix J of NUREG/CR-4448.)

Date: June 1, 1985 **Source:** SNL/United Engrs. & Constructors

35

Modification: Containment Pressure Relief **Type:** Mit

Description: Pressure relief valves are provided to allow venting of steam to the stack. This option is designed for the relief of an ATWS-induced pressure loading. The valves are reclosed at the containment design pressure. Two 24" valves are required.

Total Onetime Cost	$1,728,000		
Labor:	$720,000	**Interest:**	
Materials:	$450,000	**Downtime Costs:**	
Design and Mgt:	$200,000		
Owner's Costs:		**Total Recurring Costs:**	
Other:	$345,000		

Line Item Costs:	**Labor:**	**Materials:**
Relief Valve, 170,000 lb, 24"		$100,000

Comments:

1. This includes two new penetrations.
2. This design is for a BWR Mark II.
3. There appears to be an error in the valve calculation, but it is difficult to trace.

Reference: Mitigation Systems for Mark II Reactors", Dooley, J. L., et al. R & D Associates, Marina del Ray, CA: May 1984--preliminary report. Table A-9

Date: May 1, 1984 **Source:** R & D Associates

36

Modification: Aux Feed Pump Room Fire Protection (810) **Type:** Prev.

Description: Addition of a fire system to protect the AFW pumps and the overhead cable trays. Other important equipment in the room would be waterproofed. The system includes a 4" main header, four sprinkler groups and four deluge valves and 24 smoke and temperature alarms.

Total Onetime Cost	$1,882,000		
Labor:	$754,000	**Interest:**	
Materials:	$54,000	**Downtime Costs:**	
Design and Mgt:	$26,000		
Owner's Costs:	$147,000	**Total Recurring Costs:**	$7,000
Other:	$370,000		

Line Item Costs:	**Labor:**	**Materials:**

Comments:

1. All costs except labor and materials had to be estimated by reviewing the total for mods 810 & 302. Based on a review of the impacts, the other costs were split 75% for mod 810 and 25% for mod 302. O&M costs were split 50%-50%.

Reference: "Plant Impact Assessment Report for Point Beach NPP: Decay Heat Removal Alternatives" (PIAR-1). Tables 4.2-1,2. (See Appendix J of NUREG/CR-4458.)

Date: June 1, 1985 **Source:** SNL/United Engrs. & Constructors

488

37

Modification: Radiological Monitoring of Effluents **Type:** Mit.

Description: Addition of four noble gas monitors on steam lines at PWRs, and real time isotopic analysis at four locations. this involves on-line spectral analysis with qualified equipment.

Total Onetime Cost $2,300,000

Labor:
Materials:
Design and Mgt:
Owner's Costs: $600,000
Other:

Interest:
Downtime Costs:
Total Recurring Costs: $35,000

Line Item Costs:	**Labor:**	**Materials:**
1 effluent monitor	$150,000	$250,000
PWR noble gas monitor	$38,000	$50,000

Comments: 1. Total shown above is average, BWR and PWR. The cost elements are of more use.

Reference: "Report to the AIF Policy Committee on Follow Up to the TMI Accident by the Working Group on Action Plan Priorities and Resources." Letter to Harold Denton from the Atomic Industrial Forum. February 22,1980.

Date: February 22, 1980 **Source:** Industry Working Group

38

Modification: Gas Combustor System **Type:** Mit.

Description: A blower forces air from containment (40" line) through a moisture separator and into a propane burner. Oxygen is added as required. Exhaust is to containment. System is powered by a dedicated diesel or gas turbine. System is used to inert containment on demand.

Total Onetime Cost $2,600,000

Labor:
Materials:
Design and Mgt:
Owner's Costs:
Other:

Interest:
Downtime Costs:
Total Recurring Costs:

Line Item Costs:	**Labor:**	**Materials:**
1. Valve (36" AOV)		$40,000
2. Blower		$35,000
3. Diesel generator, 400 kw		$80,000
4. Pipe, schudule 10–per pound		$1
5. Cooling water tank (30'x30')		$150,000

Comments:
1. One system would serve two nuclear units.
2. Very low reliability precluded this as an option.
3. Cost estimate does not include the major costs, e.g. installation.

Reference: "Conceptual Design of a Core Melt Mitigation System for a PWR with an Ice Condenser Containment" EGG-PR-5633. H. J. Reilly, et. al., USDOE. Appendix A

Date: February 1, 1982 **Source:** EG&G Idaho

39 **Modification:** Independent Containment Heat Removal **Type:** Mit/Prev

Description: A new, independent containment heat removal for a Mark II BWR. It is diesel powered and cools suppression pool water (or containment spray water in conjunction with additional equipment). The cooling water is obtained from and returned to a pond. The system is completely redundant and is in a bunkered building.

Total Onetime Cost	$2,770,000		
Labor:	$825,000	**Interest:**	
Materials:	$1,300,000	**Downtime Costs:**	
Design and Mgt:	$275,000		
Owner's Costs:		**Total Recurring Costs:**	
Other:	$560,000		

Line Item Costs:	**Labor:**	**Materials:**
Diesel pump engines—400hp		$40,000
Bunkered building, 1800 sf	$130,000	$170,000
One 8 inch containment penetration		$100,000
Piping and valves for pond cooling water		$250,000
Control system, non-electrical		$63,000

Comments:
1. The line item costs could not fully be divided into materials and labor.
2. These costs are for an operating plant.
3. It is not clear that owners' costs and other indirect costs were given detailed consideration and the total costs could therefore be low.

Reference: "Mitigation Systems for Mark II Reactors", Dooley, J. L., et al. R & D Associates, Marina del Ray, CA: May 1984--preliminary report. Table A-1

Date: May 1, 1984 **Source:** R & D Associates

40 **Modification:** Low-Flow Vent Filter **Type:** Mit

Description: This design calls for a low-flow vent with a gravel filter that is capable of handling the steam spike associated with the core release from the vessel, but not sized to handle ATWS or residual heat removal.

Total Onetime Cost	$2,785,000		
Labor:	$1,230,000	**Interest:**	
Materials:	$620,000	**Downtime Costs:**	
Design and Mgt:	$375,000		
Owner's Costs:		**Total Recurring Costs:**	
Other:	$560,000		

Line Item Costs:	**Labor:**	**Materials:**

Comments:
1. This includes two new penetrations.
2. This design is for a BWR Mark II.

Reference: Mitigation Systems for Mark II Reactors", Dooley, J. L., et al. R & D Associates, Marina del Ray, CA: May 1984--preliminary report. Table A-10

Date: May 1, 1984 **Source:** R & D Associates

490

41 **Modification:** Core Redistribution System **Type:** Mit

Description: The core is directed away from the area directly under the vessel by installing thoria protection and a dike which directs the core to downcomer pipes leading to the suppression pool or basemat. The basemat is also protected by thoria rubble. [Note: this option could be oversimplified and undercosted.]

Total Onetime Cost $3,330,000

Labor: $1,470,000
Materials: $680,000
Design and Mgt: $312,000
Owner's Costs:
Other: $867,000

Interest:
Downtime Costs:
Total Recurring Costs:

Line Item Costs:	**Labor:**	**Materials:**
Radiation protection costs		$200,000

Comments:
1. This option appears understated: industry sources have indicated that there would be great difficulties in backfitting this option.
2. This would involve significant downtime costs.
3. This also requires drywell cooling to protect penetrations.

Reference: Mitigation Systems for Mark II Reactors", Dooley, J. L., et al. R & D Associates, Marina del Ray, CA: May 1984--preliminary report. Table A-5

Date: May 1, 1984 **Source:** R & D Associates

42 **Modification:** Core Retention and Cooling System **Type:** Mit

Description: The area under the vessel is modified to control the distribution of melted core material, and pathways are added to ensure that there is a certain amount of water over the rubble bed. This option is also limited by incomplete understanding of core melt phenomenology and it may not work. It also appears undercosted.

Total Onetime Cost $3,445,000

Labor: $1,780,000
Materials: $400,000
Design and Mgt: $466,000
Owner's Costs:
Other: $800,000

Interest:
Downtime Costs: $8,000,000
Total Recurring Costs:

Line Item Costs:	**Labor:**	**Materials:**

Comments:
1. This option appears grossly understated, and other sources have indicated that there would be great difficulties in backfitting this option.
2. Feasibility in terms of the structural changes required is also an unknown.
3. This would probably involve very significant downtime.

Reference: Mitigation Systems for Mark II Reactors", Dooley, J. L., et al. R & D Associates, Marina del Ray, CA: May 1984--preliminary report. Table A-6

Date: May 1, 1984 **Source:** R & D Associates

491

43

Modification: Addition of Two Hydrogen Recombiners **Type:** Mit

Description: Two 70 cfm hydrogen recombiners are added, along with a dedicated (110 kw) diesel.

Total Onetime Cost $3,572,000

Labor: $920,000

Materials: $1,625,000

Design and Mgt: $312,000

Owner's Costs:

Other: $715,000

Interest:

Downtime Costs:

Total Recurring Costs:

Line Item Costs:	**Labor:**	**Materials:**
One 110 kw diesel		$50,000

Comments:

1. This includes two new penetrations.
2. This design is for a BWR Mark II.

Reference: Mitigation Systems for Mark II Reactors", Dooley, J. L., et al. R & D Associates, Marina del Ray, CA: May 1984--preliminary report. Table A-10

Date: May 1, 1984 **Source:** R & D Associates

44

Modification: Add-on Spray System, No Recirculation **Type:** Mit.

Description: Addition of a single train spray system that provides spray and cavity flooding but has no recirculation or heat removal capability. It is housed in a new building.

Total Onetime Cost $3,680,000

Labor:

Materials:

Design and Mgt: $725,000

Owner's Costs: $610,000

Other:

Interest:

Downtime Costs:

Total Recurring Costs: $50,000

Line Item Costs:	**Labor:**	**Materials:**

Comments:

1. HIS costs from Alternative 1 in the reference. Other costs between ACSS and PCS were split 35%/65% based on construction costs. All costs are rough averages.
2. Recurring costs are estimated.

Reference: "Study of Severe Accident Mitigation Systems" (Draft). R. Cherdack, Burns and Roe, Inc., D. Kuneman, SNL project manager. Table 4.2-2 and Section 4.

Date: January 1, 1985 **Source:** Burns and Roe

492

EST COPY AVAILABLE

45

Modification: Safety Parameter Display System   **Type:** Prev.

Description: Installation of automatic system to monitor radioactivity, heat sink, reactivity, inventory, and containment integrity. Mini-computer based, with 400 inputs. Non-safety grade, and no new sensors.

Total Onetime Cost $4,100,000

Labor:
Materials:
Design and Mgt:
Owner's Costs: $585,000
Other:

Interest:
Downtime Costs:
Total Recurring Costs: $25,000

Line Item Costs: **Labor:**   **Materials:**

Comments:
1. No predictive capability.
2. Installation time: 25 months
3. Estimated 5% chance of exceeding 8 million.

Reference: "Report to the AIF Policy Committee on Follow Up to the TMI Accident by the Working Group on Action Plan Priorities and Resources." Letter to Harold Denton from the Atomic Industrial Forum. February 22,1980.

Date: February 22, 1980   **Source:** Industry Working Group

46

Modification: High-Flow Vent Filter   **Type:** Mit

Description: A vent filter is added which can handle the steam flow during an ATWS and will act as a vent filter to reduce the pressure spike associated with steam spikes or hydrogen burning. This is a composite of the systems described in Records 61 and 62.

Total Onetime Cost $4,242,000

Labor: $1,742,000
Materials: $1,200,000
Design and Mgt: $460,000
Owner's Costs:
Other: $840,000

Interest:
Downtime Costs:
Total Recurring Costs:

Line Item Costs: **Labor:**   **Materials:**

Comments:
1. This includes two new penetrations.
2. This design is for a BWR Mark II.

Reference: Mitigation Systems for Mark II Reactors", Dooley, J. L., et al. R & D Associates, Marina del Rey, CA: May 1984--preliminary report. Table A-11

Date: May 1, 1984   **Source:** R & D Associates

BEST COPY AVAILABLE

493

47

Modification: Injection Suction Line From Fuel Pool (806) **Type:** Prev.

Description: Connection of a suction pipe to the spent fuel pool cooling system to provide a seismically qualified suction for the safety injection pumps. Two MOVs will automatically actuate on low level in RWST. (The spent fuel pumps are needed for this.)

Total Onetime Cost	$4,870,000		
Labor:	$2,036,000	**Interest:**	
Materials:	$119,000	**Downtime Costs:**	
Design and Mgt:	$195,000		
Owner's Costs:	$375,000	**Total Recurring Costs:**	$1,000
Other:	$2,145,000		

Line Item Costs:	**Labor:**	**Materials:**
2 Movs,1 Check, 200' of 8" pipe		$119,000

Comments:

1. 90% of the non-material, non-labor costs for Alternative 1 in PIAR-1 were assigned to this modification since it is the largest mod in the alternative.
2. O&M costs were estimated from review of impact document.

Reference: "Plant Impact Assessment Report for Point Beach NPP: Decay Heat Removal Alternatives" (PIAR-1). Tables 4.1-1,2. (See Appendix J of NUREG/CR-4458.)

Date: June 1, 1985 **Source:** SNL/United Engrs. & Constructors

48

Modification: Safety System Status Monitor **Type:** Prev.

Description: Addition of a status monitor for all active components within safety systems. Not safety grade. Not on plant computer, installation of new mini-computer instead. A completely automatic system with 400 inputs.

Total Onetime Cost	$6,000,000		
Labor:		**Interest:**	
Materials:		**Downtime Costs:**	
Design and Mgt:			
Owner's Costs:	$1,000,000	**Total Recurring Costs:**	$50,000
Other:			

Line Item Costs:	**Labor:**	**Materials:**

Comments:

1. Probable implementation time of 30 months.
2. Estimated 7% chance of 12 million, 40% of exceeding 7 million.

Reference: "Report to the AIF Policy Committee on Follow Up to the TMI Accident by the Working Group on Action Plan Priorities and Resources." Letter to Harold Denton from the Atomic Industrial Forum. February 22,1980.

Date: February 22, 1980 **Source:** Industry Working Group

49

Modification: New Diesel Cooling Water Pump (803) **Type:** Prev.

Description: A new cooling pump is added in the RHR pump room. It has a 10" suction tied into a 24" pipe. It branches into two parallel paths and then ties into the current diesel cooling system. The system is manually alligned.

Total Onetime Cost $6,111,000

Labor: $2,434,000
Materials: $179,000
Design and Mgt: $235,000
Owner's Costs: $427,000
Other: $2,836,000

Interest:
Downtime Costs:
Total Recurring Costs: $6,000

Line Item Costs:	**Labor:**	**Materials:**
900 gpm pump, 2 each manual valve MOV and check valves		$179,000

Comments:

Reference: "Plant Impact Assessment Report for Quad Cities NPP: Decay Heat Removal Alternatives" (PIAR-2). Tables 4.2-1,2. (See Appendix J of NUREG/CR-4448.)

Date: June 1, 1985 **Source:** SNL/United Engrs. & Constructors

50

Modification: Closed-Loop Containment Cooling System **Type:** Mit.

Description: Addition of a new, single-train system that has no active components in containment, just large heat exchangers which have a closed loop cooling system with a diesel-driven pump. New service water train, installed as ultimate heat rejection. New building.

Total Onetime Cost $7,360,000

Labor:
Materials:
Design and Mgt: $1,335,000
Owner's Costs: $1,150,000
Other:

Interest:
Downtime Costs:
Total Recurring Costs: $80,000

Line Item Costs: **Labor:** **Materials:**

Comments:
1. HIS costs from Alternative 1. Other costs between ACSS and PCS were split 35%/65% based on construction costs. All costs are rough averages.
2. Recurring costs are estimated.

Reference: "Study of Severe Accident Mitigation Systems" (Draft). R. Cherdack, Burns and Roe, Inc., D. Kunsman, SNL project manager. Table 4.2-2 and Section 4.

Date: January 1, 1985 **Source:** Burns and Roe

51

Modification: Addition of Hydrogen Igniter System **Type:** Mit.

Description: Installation of glow plug type hydrogen igniters and hydrogen monitors, to completely cover all areas of containment. The system would be battery powered. About 40 monitors and 80 igniters are needed. The system would be auto-initiated, and self controlling.

Total Onetime Cost $7,580,000

Labor:			
Materials:		**Interest:**	
Design and Mgt:	$1,440,000	**Downtime Costs:**	
Owner's Costs:	$1,264,000	**Total Recurring Costs:**	$50,000
Other:			

Line Item Costs: **Labor:** **Materials:**

Comments:
1. 70% of aux & support costs of Alternative 1 were assigned to ACSS. Then the totals for ACCS and HIS were used to split all other costs 55%/45%.
2. No breakdown was provided on labor and materials.

Reference: "Study of Severe Accident Mitigation Systems" (Draft). R. Cherdack, Burns and Roe, Inc., D. Kunsman, SNL project manager. Table 4.2 and Section 4.

Date: January 1, 1985 **Source:** Burns and Roe

52

Modification: Add-on Containment Spray & Recirculation **Type:** Mit.

Description: Addition of a new diesel-driven spray pump, a new tank, and [illegible] capability for sump recirculation. A heat exchanger and new heat removal cooling water system is also included. The system is housed in a new building.

Total Onetime Cost $9,130,000

Labor:			
Materials:		**Interest:**	
Design and Mgt:	$1,750,000	**Downtime Costs:**	
Owner's Costs:	$1,510,000	**Total Recurring Costs:**	$100,000
Other:			

Line Item Costs: **Labor:** **Materials:**

Comments:
1. 70% of auxiliary & support costs of Alternative 1 were assigned to ACSS. Then the totals for ACCS and HIS were used to split all other costs 55%/45%.
2. No breakdown was provided on labor and materials.

Reference: "Study of Severe Accident Mitigation Systems" (Draft). R. Cherdack, Burns and Roe, Inc. D. Kunsman, SNL project manager. Table 4.2-1 and Section 4.

Date: January 1, 1985 **Source:** Burns and Roe

53

Modification: Filtered-Vent System **Type:** Mit.

Description: Low pressure vent to a crushed rock filter and then to a special 500 ft. stack. Also a high pressure vent directly to the stack. Automatic initiation with manual override. Initiated through a relief valve. All lines pass through an accessible concrete tunnel.

Total Onetime Cost $13,000,000

Labor: $5,000,000

Materials: $5,000,000

Design and Mgt: $850,000

Owner's Costs:

Other: $1,500,000

Interest:

Downtime Costs: $15,000,000

Total Recurring Costs:

Line Item Costs:	**Labor:**	**Materials:**
1. Instrumentation for system	$15,000	$45,000
2. Electrical for whole system	$40,000	$12,000
3. Stack alone (500 ft)		$5,000,000
4. Excavation and concrete	$3,000,000	$3,500,000
5. Total piping and valving	$80,000	$500,000

Comments:

1. Concrete and excavating for the tunnel and stack is the largest contributor to the cost–more than one-half the total.
2. Cost estimating done in January 1982.
3. 15 % contingency.

Reference: "Filtered-Vented Containment Systems Conceptual Designs for a Mark I Containment Boiling Water Reactor" A. L. Carter, Holmes and Narver, Inc., Letter Report to A. S. Benjamin, Sandia National Laboratories.

Date: January 13, 1982 **Source:** Sandia/Holmes and Narver

54

Modification: Containment Vent and Filter **Type:** Mit.

Description: Vent through a bed of crushed rock to a tall stack. Designed for a large dry PWR. Rupture disk initiation. Non-safety grade.

Total Onetime Cost $14,000,000

Labor:

Materials:

Design and Mgt:

Owner's Costs:

Other:

Interest:

Downtime Costs:

Total Recurring Costs:

Line Item Costs:	**Labor:**	**Materials:**

Comments: Details not investigated.

Reference: "Conceptual Design and Estimated Cost of Buried, 'Berm Contained' Nuclear Power Plants" J. E. Ward, et. al. Contract # 154-064.

Date: January 1, 1978 **Source:** Sargent & Lundy Engineers

55 **Modification:** Addition of a Fourth Diesel Generator (301) **Type:** Prev.

Description: Addition of a 2500 kw diesel generator, housed in a new building (with fire and missile protection), a new 1500 g. fuel tank, a new cooling water pump, new batteries, a transformer control panel and all other support systems.

Total Onetime Cost	$16,000,000		
Labor:	$3,350,000	**Interest:**	
Materials:	$2,930,000	**Downtime Costs:**	
Design and Mgt:	$1,850,000		
Owner's Costs:	$1,200,000	**Total Recurring Costs:**	$200,000
Other:	$6,663,000		

Line Item Costs: **Labor:** **Materials:**

Comments: 1. All of the costs from Alternative 1 are assigned to this Mod. Mod 304 costs (except labor and materials) are estimated.

Reference: "Plant Impact Assessment Report for Quad Cities NPP: Decay Heat Removal Alternatives" (PIAR-2). Tables 4.1-1,2. (See Appendix J of NUREG/CR-4448.)

Date: June 1, 1985 **Source:** SNL/United Engrs. & Constructors

56 **Modification:** Add-on LPI and Suppression Pool Cooling **Type:** Prev.

Description: Addition of a new single train LPI system with its own support, including a diesel generator, and a heat exchanger and cooling system for heat removal. Also a dedicated ADS for relief from the primary to the suppression pool.

Total Onetime Cost	$20,300,000		
Labor:	$7,500,000	**Interest:**	
Materials:		**Downtime Costs:**	$20,000,000
Design and Mgt:			
Owner's Costs:		**Total Recurring Costs:**	
Other:			

Line Item Costs: **Labor:** **Materials:**

Comments: 1. Costs were not broken out in this reference. Labor cost shown is the manhour figure provided times $50 per hour.
2. Other costs, beside construction, were estimated to be 45% of the construction cost. Power costs vary widely. 3. The 1000 Mw

Reference: "Study of the Value and Impact of Alternative Decay Heat Removal Concepts for Light Water Reactors" D. L. Berry & G. A. Sanders. NUREG/CR-2883, Printed June 83. Tables 8-10.

Date: June 1, 1983 **Source:** SNL/Burns & Roe

BEST COPY AVAILABLE

498

57

Modification: Dry Crucible, Cooled Core Catcher **Type:** Mit

Description: A cooled crucible is added under the basemat to allow for retention of the core. The core catcher is jacketed so that the core is cooled without the generation of additional gases. This option requires a cooling water source as in Record 55, so the costs shown are low by several million dollars.

Total Onetime Cost $20,500,000

Labor:

Materials:

Design and Mgt:

Owner's Costs:

Other:

Interest:

Downtime Costs:

Total Recurring Costs:

Line Item Costs: **Labor:** **Materials:**

Comments:
1. The single unit cost was used: $5M over the cost in Table A-8.
2. These costs were derived from another report, NUREG/CR-2941.
3. This would probably involve very significant downtime.
4. The costs appear low compared to others in this data base.

Reference: Mitigation Systems for Mark II Reactors", Dooley, J. L., et al. R & D Associates, Marina del Ray, CA: May 1984--preliminary report. Table A-8

Date: May 1, 1984 **Source:** R & D Associates

58

Modification: Add-on HPI for Feed and Bleed **Type:** Prev.

Description: Addition of a one-train high pressure injection system with its own support systems, new tanks and housed in two new buildings. It does include a dedicated diesel generator for use in loss of power conditions.

Total Onetime Cost $26,800,000

Labor: $11,600,000

Materials:

Design and Mgt:

Owner's Costs:

Other:

Interest:

Downtime Costs: $20,000,000

Total Recurring Costs:

Line Item Costs: **Labor:** **Materials:**

Comments:
1. Costs were not broken out in this reference. Labor cost shown is the manhour figure provided times $50 per hour.
2. Other costs, beside construction, were estimated to be 45% of the construction cost. Power costs vary widely.

Reference: "Study of the Value and Impact of Alternative Decay Heat Removal Concepts for Light Water Reactors" D. L. Berry & G. A. Sanders. NUREG/CR-2883, Printed June 83. Tables 8-10.

Date: June 1, 1983 **Source:** SNL/Burns & Roe

59 **Modification:** Add-on Aux Feed and Primary Makeup **Type:** Prev.

Description: New dedicated auxiliary feedwater system with completely independent support systems including a new diesel generator, and housed in a new building. New tanks are also used. A small high pressure primary makeup pump is also included. Two new buildings are required.

Total Onetime Cost $29,200,000

Labor: $12,850,000

Materials:

Design and Mgt:

Owner's Costs:

Other:

Interest:

Downtime Costs: $20,000,000

Total Recurring Costs:

Line Item Costs: **Labor:** **Materials:**

Comments:

1. Costs were not broken out in this reference. Labor cost shown is the manhour figure provided times $50 per hour.
2. Other costs, beside construction, were estimated to be 45% of the construction cost. Power costs vary widely.

Reference: "Study of the Value and Impact of Alternative Decay Heat Removal Concepts for Light Water Reactors" D. L. Berry & G. A. Sanders. NUREG/CR-2883, Printed June 83. Tables 8-10.

Date: June 1, 1983 **Source:** SNL/Burns & Roe

60 **Modification:** High Efficiency Containment Vent & Filter **Type:** Mit.

Description: Low and high pressure vent filter system to an existing stack with the addition of high efficiency scrubbers and filters.

Total Onetime Cost $33,000,000

Labor:

Materials:

Design and Mgt:

Owner's Costs:

Other:

Interest:

Downtime Costs:

Total Recurring Costs:

Line Item Costs: **Labor:** **Materials:**

Comments:

Reference: "Filtered-Vented Containment System Design Study," NUREG/CR-1410. Report of the Zion/Indian Point Study, A.S. Benjamin and W.B. Murfin

Date: August 1, 1980 **Source:** Sandia/Holmes and Narver

500

61

Modification: Independent Decay Heat Removal System **Type:** Prev.

Description: This is an add-on DHR system, providing a completely independent means of providing inventory to the steam generators and makeup to the reactor coolant system. The system includes two new buildings, new support equipment and new tanks.

Total Onetime Cost	$61,000,000		
Labor:	$12,600,000	**Interest:**	7,800,000
Materials:	$8,600,000	**Downtime Costs:**	
Design and Mgt:	$6,200,000		
Owner's Costs:	$4,000,000	**Total Recurring Costs:**	$585,000
Other:	$22,000,000		

Line Item Costs: **Labor:** **Materials:**

Comments:

Reference: "Plant Impact Assessment Report for Trojan Nuclear Power Plant: Decay Heat Removal Alternatives" (PIAR-4). Tables 4..3-1,2. (Unpublished)

Date: June 1, 1985 **Source:** SNL/United Engrs. & Constructors

62

Modification: Independent Decay Heat Removal System **Type:** Prev.

Description: This is an add-on DHR system, providing a completely independent means of providing inventory to the steam generators and makeup to the primary system. The design includes new tanks, new support equipment and all equipment is housed in new buildings.

Total Onetime Cost	$65,000,000		
Labor:	$14,100,000	**Interest:**	$8,500,000
Materials:	$9,000,000	**Downtime Costs:**	
Design and Mgt:	$6,500,000		
Owner's Costs:	$4,250,000	**Total Recurring Costs:**	$620,000
Other:	$22,700,000		

Line Item Costs: **Labor:** **Materials:**

Comments:

Reference: "Plant Impact Assessment Report for Point Beach NPP: Decay Heat Removal Alternatives" (PIAR-1). Tables 4.3-1,2. (See Appendix J of NUREG/CR-4458.)

Date: June 1, 1985 **Source:** SNL/United Engrs. & Constructors

501

63

Modification: Independent DHR System (613) **Type:** Prev.

Description: A completely independent system as an alternative means of heat removal. It includes RCS and suppression pool cooling, new support systems and two new buildings. The system is auto actuating and nearly completely independent from all other systems.

Total Onetime Cost	$77,550,000
Labor:	$21,000,000
Materials:	$9,900,000
Design and Mgt:	$9,000,000
Owner's Costs:	$5,750,000
Other:	$31,900,000

Interest:

Downtime Costs:

Total Recurring Costs: $845,000

Line Item Costs: **Labor:** **Materials:**

Comments:

Reference: "Plant Impact Assessment Report for Quad Cities NPP: Decay Heat Removal Alternatives" (PIAR-2). Tables 4.5-1,2. (See Appendix J of NUREG/CR-4448.)

Date: June 1, 1985 **Source:** SNL/United Engrs. & Constructors

502

References for Appendix F

1. Berry, D. L., and G. A. Sanders. *Study of the Value Impact of Alternative Decay Heat Removal Concepts for Light Water Reactors*. U. S. Nuclear Regulatory Commission Report NUREG/CR-2883, Sandia National Laboratories, Albuquerque, NM: 1983.

2. *Richardson Estimating Manual*. R. S. Means Company, Inc. Kingston, MA: 1983.

3. Carter, A. L. "Filtered-Vented Containment Systems Conceptual Design for a Mark I Containment Boiling Water Reactor" Letter Report to A. S. Benjamin, Sandia National Laboratories. Holmes and Narver, Inc., Orange, CA: January 13, 1982.

4. Cherdack, R. *Study of Severe Accident Mitigation Systems*. (Draft) Burns and Roe, Inc. Oradell, NJ: January, 1985.

5. "Plant Impact Assessment Report for the Point Beach Nuclear Power Plant" United Engineers and Constructors (June, 1985), See Appendix J of *Shutdown Decay Heat Removal Analysis: Westinghouse Two Loop Plant Case Study*, U. S. Nuclear Regulatory Commission Report NUREG/CR-4458, Sandia National Laboratories, Albuquerque, NM: (to be published).

6. "Plant Impact Assessment Report for the Quad Cities Nuclear Power Plant" United Engineers and Constructors (June, 1985), See Appendix J of *Shutdown Decay Heat Removal Analysis: General Electric BWR3/Mark I Case Study*. U. S. Nuclear Regulatory Commission Report NUREG/CR-4448, Sandia National Laboratories, Albuquerque, NM: (to be published).

7. Ball, J. R., S. Cohen, and E. J. Ziegler. *A Handbook for Cost Estimating*. NUREG/CR-3971, Argonne National Laboratories, Argonne, IL: October, 1984.

8. *The Energy Economic Data Base, Phase IV*. United Engineers and Constructors. Published periodically by the U. S. Department of Energy: 1983.

9. *NRC Task Action Plan*. (Draft) NUREG-0660. U.S. Nuclear Regulatory Commission Report, Washington, DC: 1979.

10. Lee, B. "Report to the AIF Policy Committee on the Follow-up to the Three Mile Island Accident by the Working Group on Action Plan Priorities and Resources." Letter to Harold Denton, U.S. Nuclear Regulatory Commission. Atomic Industrial Forum, Washington, DC: February 22, 1980.

11. Fullwood, R. *Value-Impact Analysis of Selected Safety Modifications to Nuclear Power Plants*. EPRI NP-3434. Electric Power Research Institute, Palo Alto, CA: March, 1984.

12. Dooley, J. L. ,et al., *Mitigation Systems for Mark II Reactors*. Preliminary Report. RDA-TR-127303-001. R & D Associates, Marina del Rey, CA: May 1984

DISTRIBUTION:

U. S. Government Printing Office
Receiving Branch (Attn: NRC Stock)
8610 Cherry Lane
Laurel, MD 20707
100 copies for AN

3141	S. A. Landenberger (5)
3151	W. L. Garner
6400	D. J. McCloskey
6410	N. R. Ortiz
6414	A. S. Benjamin (25)
6412	A. L. Camp
6412	F. T. Harper
6412	D. M. Kunsman
6512	D. M. Ericson, Jr.
6415	F. E. Haskin
6415	J. L. Sprung
6513	D. D. Carlson
6420	J. V. Walker
6422	D. A. Powers
6427	M. Berman
6440	D. A. Dahlgren
6442	W. A. von Riesemann
6449	K. D. Bergeron
6449	D. C. Williams
8024	P. W. Dean

Frank Abbey
U.K. Atomic Energy Authority
Wigshaw Lane, Culcheth
Warrington, Chesire
United Kingdom, WA3 4NE

Steven Aftergood
Committee to Bridge the Gap
1637 Butler Avenue, #203
Los Angeles, CA 90025

C. N. Amos
Technadyne, Inc.
300 Virginia SE
Albuquerque, NM 87108

George Apostolakis
University of California, Los Angeles
Boelter Hall, Room 5532
Los Angeles, CA 90024

James W. Ashkar
Boston Edison Company
800 Boylston Street
Boston, MA 02199

Donald H. Ashton
Bechtel Power Corporation
15740 Shady Grove Road
Gaithersburg, MD 20877

Mark Averett
Florida Power Corporation
P.O. Box 14042
St. Petersburg, FL 33733

Michael B. Aycock
TERA Corporation
7101 Wisconsin Avenue
Bethesda, MD 20814

Raymond C. Bagley
Northeast Utilities
P.O. Box 270
Hartford, CT 06101

J. Bagues
Consejo de Seguridad Nucleare
Sorangela de la Cruz 3
Madrid 38046
Spain

H. Bairiot
Belgonucleaire S A
Rue de Champ de Mars 25
B-1050 Brussels
Belgium

Fred J. Balkovetz
EG&G Idaho, Inc.
P.O. Box 1625
Idaho Falls, ID 83415

Patrick Baranowsky
U.S. Nuclear Regulatory Commission
Office of Nuclear Regulatory Research
Washington, DC 20555

Robert A. Bari
Brookhaven National Laboratories
Building 130
Upton, NY 11973

Richard Barrett Baskin
U.S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Washington, DC 20555

S. Kenneth
S. California Edison Company
P.O. Box 800
Rosemead, CA 91770

Werner Bastl
Gesellschaft Fur Reaktorsicherheit
Forschungsgelande
8046 Garching
Federal Republic of Germany

Paul Baybutt
Battelle Columbus Division
505 King Avenue
Columbus OH 43201

Bruce B. Beckley
Public Service Company
P.O. Box 330
Manchester, NH 03105

Myer Bender
Querytech, Inc.
408 Cedar Bluff Road
Knoxville, TN 37923

506

R. C. Bertucio
Energy Incorporated
1851 So. Central Place, Suite 201
Kent, WA 98031

Peter Bieniarz
Risk Management Association
2309 Dietz Farm Road, NW
Albuquerque, NM 87107

Adolf Birkhofer
Gesellschaft Fur Reaktorsicherheit
Forschungsgelande
8046 Garching
Federal Republic of Germany

James Blackburn
Illinois Dept. of Nuclear Safety
1035 Outer Park Drive
Springfield, IL 62704

Dennis C. Bley
Pickard, Lowe & Garrick, Inc.
2260 University Drive
Newport Beach, CA 92660

Roger M. Blond
Science Applications Int. Corp.
1710 Goodridge Drive
McLean, VA 22102

A. John Bourne
U.K. Atomic Energy Authority
Wigshaw Lane, Culcheth
Warrington, Chesire
United Kingdom, WA3 4NE

G. J. Boyd
Safety & Reliability Optimization
  Services
9724 Kingston Pike
Knoxville, TN 37922

K. J. Brinkmann
Netherlands Energy Res. Fdtn.
P.O. Box 1
1755ZG Petten NH
Netherlands

BEST COPY AVAILABLE

R. H. Buchholz
Nutech
6835 Via Del Oro
San Jose, CA 95119

Fred Buckman
Delian Corporation
296 Duff Road
Monroeville, PA 15146

Robert J. Budnitz
Future Resources Associates
734 Alameda
Berkeley, CA 94707

A. R. Buhl
International Technology Corp.
575 Oak Ridge Turnpike
Oak Ridge, TN 37830

Gary R. Burdick
U.S. Nuclear Regulatory Commission
Office of Nuclear Regulatory Research
Washington, DC 20555

Kenneth S. Canady
Duke Power Company
422 S. Church Street
Charlotte, NC 28217

Lennart Carlsson
Swedish Nuclear Power Inspectorate
Box 27106
Stockholm, Sweden 08-635560
Sweden

Annick Carnino
Electricite de France
32 Rue de Monceau 8EME
Paris, France F5008
France

N. G. Cathey
Idaho National Engineering Lab.
P. O. Box 1625
Idaho Falls, ID 83415

Ivan Catton
22436 Galilee Street
Woodland Hills, CA 91364

S. Chakraborty
Radiation Protection Section
Div. De La Securite Des Inst. Nuc.
5303 Wurenlingen, Switzerland
Switzerland

Sen-I Chang
Institute of Nuclear Energy Research
P.O. Box 3
Lungtan, 325 Taiwan

Robert F. Christie
Tennessee Valley Authority
400 W. Summit Hill Avenue, W10D1
90 Knoxville, TN 37902

Frank Coffman
U.S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Washington, DC 20555

Larry L. Conradi
Energy Incorporated
1851 South Central Place, Suite 201
Kent, WA 98031

Peter Cooper
U.K. Atomic Energy Authority
Wigshaw Lane, Culcheth
Warrington, Chesire
United Kingdom, WA3 4NE

Michael Corradini
University of Wisconsin
1500 Johnson Drive
Madison, WI 53706

Michael Cullingford
IAEA
P.O. Box 200
A-1400 Vienna, Austria

Garth Cummings
Lawrence Livermore Laboratory
L-91, Box 808
Livermore, CA 94526

Mark A. Cunningham
U.S. Nuclear Regulatory Commission
Office of Nuclear Regulatory Research
Washington, DC 20555

509

James J. Curry
7135 Salem Park Circle
Mechanicsburg, PA 17055

Peter Cybulskis
Battelle Columbus Division
505 King Avenue
Columbus, OH 43201

Peter R. Davis
Intermountain Technologies, Inc.
P.O. Box 1604
Idaho Falls, ID 83401

Jose DeCarlos
Sor Angela De la Cruz, No. 3, Planta 8
Madrid 28016, Spain

Richard Deem
New York Power Authority
123 Main Street
White Plains, NY 10601

Richard S. Denning
Battelle Columbus Division
505 King Avenue
Columbus, OH 43201

Raymond DiSalvo
Battelle Columbus Division
505 King Avenue
Columbus, OH 43201

Adel A. El-Bassioni
U.S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Washington, DC 20555

J. Mark Elliott
International Energy Associates, Ltd.
600 New Hampshire Ave. NW, Suite 600
Washington, DC 20037

Energy Issues Rep.
Sierra Club
1228 North Street#31
Sacramento, CA 95814

Malcolm L. Ernst
U.S. Nuclear Regulatory Commission
101 Marietta Street, Suite 3100
Atlanta, GA 30323

Executive Director
Natural Resources Defense Council
122 East 42nd Street
New YorkNY 10168

P. Fehrenback
Atomic Energy Canada, Ltd.
Chalk River
Ontario, Canada

A. Fiege
Kernforschungszentrum
Postfach 3640
7500 Karlsruhe
Federal Republic of Germany

George F. Flanagan
Oak Ridge National Laboratories
P.O. Box Y
Oak Ridge, TN 37831

Mario Fontana
International Technology Corp.
575 Oak Ridge Turnpike
Oak Ridge, TN 37830

Ray R. Fray
Pacific Gas and Electric Co.
215 Market Street, Room 206
San Francisco, CA 94106

James Fulford
NUS Corporation
910 Clopper Road
Gaithersburg, MD 20878

J. B. Fussell
JBF Associates, Inc.
1630 Downtown West Boulevard
Knoxville, TN 37919

Raymond H. V. Gallucci
Battelle Pacific Northwest Labs.
P.O. Box 999
Richland, WA 99352

John Garrick
Pickard, Lowe & Garrick, Inc.
2260 University Drive
Newport Beach, CA 92660

John Gaunt
British Embassy
3100 Massachusetts Avenue, NW
Washington, DC 20008

J. Gieseke
Battelle Columbus Division
505 King Avenue
Columbus, OH 43201

James C. Glynn
U.S. Nuclear Regulatory Commission
Office of Nuclear Regulatory Research
Washington, DC 20555

L. Hammar
Statens Karnkraftinspektion
P.O. Box 27106
S-10252 Stockholm, Sweden

M. R. Hayns
U.K. Atomic Energy Authority
Wigshaw Lane, Culcheth
Warrington, Chesire
United Kingdom WA3 4NE

Robert E. Henry
Fauske and Associates, Inc.
16W070 West 83rd Street
Burr Ridge, IL 60521

Daniel Hirsch
University of California
A. Stevenson Prog. on Nuclear Policy
Santa Cruz, CA 95064

Steven Hodge
Oak Ridge National Laboratories
P.O. Box Y
Oak Ridge, TN 37831

Thomas C. Houghton
KMC, Inc.
1747 Pennsylvania Avenue, NW
Washington, DC 20006

Dean Houston
U.S. Nuclear Regulatory Commission
Advisory Comm. on Reactor Safeguards
Washington, DC 20555

512

Der Yu Hsia
Taiwan Atomic Energy Council
67, Lane 144, Keelung Rd., Sec. 4
Taipei, Taiwan

R. E. Jaquith
Combustion Engineering, Inc.
1000 Prospect Hill Road
M/C 9490-2405
Windsor, CT 06095

Kjell Johannson
Studsvik Energiteknik AB
S-611 82, Nykoping, Sweden

D. H. Johnson
Pickard, Lowe & Garrick, Inc.
2260 University Drive
Newport Beach, CA 92660

Vojin Joksimovich
NUS Corporation
16885 W. Bernardo Drive
San Diego, CA 92127

H. R. Jun
Korea Adv. Energy Research Inst.
P.O. Box 7, Daeduk Danju
Chungnam 300-31, Korea

Peter Kafka
Gesellschaft Fur Reaktorsicherheit
Forschungsgelande 8046 Garching
Federal Republic of Germany

M. Kahatib-Rahbar
Brookhaven National Laboratory
Associated Universities, Inc.
Upton, NY 11973

Geoffrey D. Kaiser
NUS Corporation
910 Clopper Road
Gaithersburg, MD 20878

W. Kastenburg
UCLA
5532 Boelter Hall
Los Angeles, CA 90024

5/3

W. Kato
Brookhaven National Laboratory
Associated Universities, Inc.
Upton, NY 11973

William Kerr
University of Michigan, North Campus
Department of Nuclear Engineering
Ann Arbor, MI 48109

George Klopp
Commonwealth Edison Company
P.O. Box 767, Room 35W
Chicago, IL 60690

Klaus Koberlein
Gesellschaft Fur Reaktorsicherheit
Forschungsgelande 8046 Garching
Federal Republic of Germany

E. Kohn
Atomic Energy Canada Ltd.
Candu Operations, Mississauga
Ontario, Canada

Herbert J. C. Kouts
Brookhavén National Laboratories
Building 179C
Upton, L.I. NY 11973

Thomas Kress
Oak Ridge National Laboratories
P.O. Box Y
Oak Ridge, TN 37831

Jeanne-Marie Lanore
CEA B.P. No. 6
92660 Fonenay-Au-Roses, France

John C. Lee
University of Michigan, North Campus,
Dept. of Nuclear Engineering
Ann Arbor, MI 48109

Harold W. Lewis
University of California
Physics Department
Santa Barbara, CA 93106

Librarian
Atomic Industrial Forum
7101 Wisconsin Avenue
Bethesda, MD 20814

Eng Lin
Taiwan Power Company
242, Roosevelt Rd., Sec. 3
Taipei, Taiwan

J. P. Longworth
Central Electric Gen'Ting Brd.
Berkeley Gloucester
GL13 9PB United Kingdom

William J. Luckas
Brookhaven National Laboratories
Building 130
Upton, L.I., NY 11973

Hans Ludewig
Brookhaven National Laboratories
Building 130
Upton, L.I., NY 11973

P. MacDonald
EG&G Idaho, Inc.
P.O. Box 1625
Idaho Falls, ID 83415

A. P. Malinauskas
Oak Ridge National Laboratories
P.O. Box Y
Oak Ridge, TN 37831

Giuseppe Mancini
Commission European Comm.
CEC-JRC Eratcn
Ispra Varese, Italy

Alan McGowan
Scientists Institute for Public Info.
355 Lexington Avenue
New York, NY 10017

Ralph Meyer
U.S. Nuclear Regulatory Commission
Office of Nuclear Regulatory Research
Washington, DC 20555

5/5

Joselyn Mitchell
U.S. Nuclear Regulatory Commission
Office of Nuclear Regulatory Research
Washington, DC 20555

Joseph A. Murphy
U.S. Nuclear Regulatory Commission
Office of Nuclear Regulatory Research
Washington, DC 20555

Sue Niemczyk
1545 18th St. NW, #112
Washington, DC 20036

Edward P. O'Donnell
Ebasco Services, Inc.
2 World Trade Center, 89th Floor
New York, NY 10048

David Okrent
University of California, Los Angeles
Boelter Hall, Room 5532
Los Angeles, CA 90024

William Parkinson
Delian Corporation
1340 Saratoga-Sunnyvale Road
Suite 206
San Jose, CA 95129

G. Petrangeli
ENEA Nucl. Energ. ALT Disp
Via V Brancati 48
00144 Roma, Italy

Robert D. Pollard
Union of Concerned Scientists
1616 P Street, NW, Suite 310
Washington, DC 20036

R. Potter
UK Atomic Energy Authority
Winfrith Dorchester Dorset
DT2 8DH United Kingdom

William T. Pratt
Brookhaven National Laboratories
Building 130
Upton, NY 11973

David Pyatt
U.S. Nuclear Regulatory Commission
Office of Nuclear Regulatory Research
Washington, DC 20555

Ingvard Rasmussen
Riso National Laboratory
Postbox 49 DK-4000
Roskilde, Denmark

Norman C. Rasmussen
Massachusetts Institute of Technology
77 Massachusetts Avenue
Cambridge, MA 02139

Dennis Richardson
Westinghouse Electric Corporation
P. O. Box 355
Pittsburg, PA 15230

Robert Ritzman
Electric Power Research Institute
3412 Hillview Avenue
Palo Alto, CA 94304

Denwood F. Ross
U.S. Nuclear Regulatory Commission
Office of Nuclear Regulatory Research
Washington, DC 20555

Frank Rowsome
U.S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Washington, DC 20555

John Siegal
Atomic Industrial Forum
7101 Wisconsin Avenue
Bethesda, MD 20814

Chester P. Siess
Advisory Comm. on Reactor Safeguards
805 Hamilton Drive
Champaign, IL 61820

Melvin Silberberg
U.S. Nuclear Regulatory Commission
Office of Nuclear Regulatory Research
Washington, DC 20555

517

K. Soda
Japan Atomic Energy Res. Inst.
Tokai-Mura Naka-Gun
IBARAKI-KEN 319-11, Japan

Leonard Soffer
U.S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Washington, DC 20555

Themis P. Speis
U.S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Washington, DC 20555

Klaus B. Stadie
OECD-NEA, 38 Bld. Suchet
75016 Paris, France

Wayne L. Stiede
Commonwealth Edison Company
P.O. Box 767
Chicago, IL 60690

John Taylor
Electric Power Research Institute
3412 Hillview Avenue
Palo Alto, CA 94303

Merrill A. Taylor
U.S. Nuclear Regulatory Commission
Office of the EDO
Washington, DC 20555

Technical Library
Electric Power Research Institute
P.O. Box 10412
Palo AltoCA 94304

Mark I. Temme
General Electric, Inc.
P.O. Box 3508
Sunnyvale, CA 94088

T. G. Theofanous
University of California, S.B.
Dept. of Chemical and Nuclear Eng.
Santa Barbara, CA 93106

518

Gordon Thompson
Inst. for Resource & Security
Studies
27 Elsworth Avenue
Cambridge, MA 02139

Long Sun Tong
9733 Lookout Place
Gaithersburg, MD 20879

A. F. Torri
Pickard, Lowe & Garrick, Inc.
191 Calle Magdalena, Suite 290
Encinitas, CA 92024

Chao-Chin Tung
Atomic Energy Council
67 Lane 144, Sec 4, Keelung Rd.
Taipei, Taiwan

Ian B. Wall
Electric Power Research Institute
P.O. Box 10412
Palo Alto, CA 94303

David Ward
Savannah River Laboratories
Building 773-A, A-219
Aiken, SC 29808

Edward Warman
Stone & Webster Engineering Corp.
P.O. Box 2325
Boston, MA 02107

Norman Weber
Sargent & Lundy Co.
55 E. Monroe Street
Chicago, IL 60603

Lois Webster
American Nuclear Society
555 N. Kensington Avenue
La Grange Park, IL 60525

Paul Wood
Delian Corporation
296 Duff Road
Monroeville, PA 15146

John Wreathall
Battelle Columbus Division
505 King Avenue
Columbus, OH 43201

Roger Wyrick
Inst. for Nuclear Power Operations
1100 Circle 75 Parkway, Suite 1500
Atlanta, GA 30339

Jonathan Young
Energy, Inc.
1851 South Central Place
Suite 201
Kent, WA 98031

Steven Sholly
MAB Technical Associates
1723 Hamilton Avenue, Suite K
San Jose, CA 95125

Sam Hobbs
Mississippi Power & Light
Post Office box 1640
Jackson, Mississippi 39215-1640

Gary Smith
Mississippi Power & Light
Post Office box 1640
Jackson, Mississippi 39215-1640

Mr. A. R. Diederich
Supervising Engineer
Environmental Branch
Philadelphia Electric Company
2301 Market Street
Philadelphia, Pennsylvania 19101

Greg Krueger
Philadelphia Electric Company
2301 Market Street
Philadelphia, Pennsylvania 19101

Margaret Federline
U.S. Nuclear Regulatory Commission
Office of the Commission
Washington, D.C. 20555

Walter Lowenstein
Electric Power Research Institute
Post Office Box 10412
Palo Alto, California 94303

520

William Vesely
Science Applications Int. Corp.
2929 Kenny Road, Suite 245
Columbus, Ohio 43221

Gareth Parry
NUS Corporation
910 Clopper Road
Gaithersburg, Maryland 20878

Doug Rickeard
Virginia Electric Power Company
James River Plaza
Post Office Box 26666
Richmond, Virginia 23261

R. J. Hardwick, Jr.
Innsbrook Technical Center
5000 Dominion Boulevard
Glen Allen, Virginia 23060

Roberta Gallante
Tennessee Valley Authority
400 West Summit Hill Drive
W4A24C-k
Knoxville, Tennessee 37902

NRC FORM 335
(2-84)
NRCM 1102,
3201, 3202

U.S. NUCLEAR REGULATORY COMMISSION

BIBLIOGRAPHIC DATA SHEET

SEE INSTRUCTIONS ON THE REVERSE

1 REPORT NUMBER (Assigned by TIDC, add Vol. No., if any)
NUREG/CR-4551
SAND86-1309
Vol. 3 (2 of 2)

2. TITLE AND SUBTITLE
EVALUATION OF SEVERE ACCIDENT RISKS AND THE POTENTIAL FOR RISK REDUCTION: PEACH BOTTOM, UNIT 2, Appendices (Draft Report for Comment)

3 LEAVE BLANK

4 DATE REPORT COMPLETED
MONTH February
YEAR 1987

5. AUTHOR(S)
C. N. Amos, A. S. Benjamin, G. J. Boyd,
J. M. Griesmeyer, F. E. Haskin, J. C. Helton,
D. M. Kunsman, S.R. Lewis, L. N. Smith

6 DATE REPORT ISSUED
MONTH May
YEAR 1987

7. PERFORMING ORGANIZATION NAME AND MAILING ADDRESS (Include Zip Code)
Sandia National Laboratories
Albuquerque, NM 87185

8. PROJECT/TASK/WORK UNIT NUMBER

9 FIN OR GRANT NUMBER
A1322

10. SPONSORING ORGANIZATION NAME AND MAILING ADDRESS (Include Zip Code)
Division of Reactor Analysis
Office of Nuclear Regulatory REsearch
U.S. Nuclear Regulatory Commission
Washington, DC 20555

11a. TYPE OF REPORT

b. PERIOD COVERED (Inclusive dates)

12 SUPPLEMENTARY NOTES

13. ABSTRACT (200 words or less)

The Severe Accident Risk Reduction Program (SARRP) has completed a rebaselining of the risks to the public from a boiling water reactor with a Mark I containment (Peach Bottom, Unit 2). Emphasis was placed on determining the magnitude and character of the uncertainties, rather than focusing on a point estimate. The risk-reduction potential of a set of proposed safety option backfits was also studied, and their costs and benefits were also evaluated. It was found that the risks from internal events are generally low relative to previous studies; for example, most of the uncertainty range is lower than the point estimate of risk for the Peach Bottom plant in the *Reactor Safety Study* (RSS). However, certain unresolved issues cause the top of the uncertainty band to appear at a level that is comparable with the RSS point estimate. These issues include the modeling of the common-mode failures for the dc power system, the likelihood of offsite power recovery versus time during a station blackout, the probability of drywell failure resulting from meltthrough of the drywell shell, the magnitude of the fission product releases during core-concrete interactions, and the decontamination effectiveness of the reactor enclosure building. Most of the postulated safety options do not appear to be cost effective, although some based on changes to procedures or inexpensive hardware additions may be marginally cost effective. This draft for comment of the SARRP report for Peach Bottom is published in two parts, this part containing the detailed technical Appendices. This work supports the Nuclear Regulatory Commission's assessment of severe accidents in NUREG-1150.

14 DOCUMENT ANALYSIS – a. KEYWORDS/DESCRIPTORS
severe accidents
accident sequences
risk

b. IDENTIFIERS/OPEN-ENDED TERMS

15 AVAILABILITY STATEMENT

16 SECURITY CLASSIFICATION
(This page)
(This report)

17 NUMBER OF PAGES

18 PRICE

*U.S. GOVERNMENT PRINTING OFFICE:1987-181-682:60107

532

BEST COPY AVAILABLE